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April 1985

Oregon Wilderness

Environmental Impact Statement

Volume II

Includes Appendices for all WSAs beginning with OR-1, OR-5, OR-11, and OR-12

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Appendix to the Wilderness Environmental Impact Statement for Oregon

Devils Garden Lava Bed Wilderness Study Area (OR-1-2)

General Description of the Study Area

The Devils Garden Lava Bed wilderness study area (WSA) is located about 60 miles southwest of Bend, Oregon in Lake County (see map 1). The WSA is eight miles north of the small town of Fort Rock and accessible by county road from Oregon State Highway 31.

The shape of the study area is roughly rectangular. It contains 28,720 acres, all of it public land (see map 2).

The boundaries are defined on the east by split-estate lands (federally managed surface, state or privately owned subsurface mineral rights) and vehicle ways (vehicle routes established and maintained solely by the passage of vehicles) associated with a powerline right-of-way. On the north, west, and south, land ownership and roads define the boundary. Private lands scattered around the boundary and forming parts of it are primarily used for livestock grazing.

A dead-end road extends 2 miles into an area known as "The Garden" on the west side of the WSA, forming part of the boundary.

The majority of the WSA has extremely rugged terrain covered by a recent lava flow. Rough aa lava, very sharp and broken in appearance, overlies most of the northern portion, while smoother textured, less rugged pahoehoe flows cover the south portion of the WSA. An area of some 3,900 acres of open soils not covered by lava in the north part of the WSA is known as the "Devils Garden" and the "East Garden" (collectively "The Garden"). The Garden is sagebrush and grass land with some large cinder cones and is more open than the rest of the WSA.

The lava area in the north supports juniper, mountain mahogany, ponderosa pine, varied grasses and abundant shrubs. The southern pahoehoe flow has been burned by wildfire within the past 20 years, but some junipers and brush areas remain, with a variety of grasses growing in any available soils.

There are a number of lava tube caves in the WSA, the largest and best known being Derrick Cave, near the northeast corner of the WSA. A number of cinder cones occur in the area, the most interesting known as the "Little Garden" in the northeast, which is covered by ponderosa pine.

Interrelationships

A 460-acre roadless area in the Deschutes National Forest abuts the WSA on the north.

The entire WSA has been designated as the Devils Garden Area of Critical Environmental Concern (ACEC) to protect the high natural values in the area. The ACEC designation provides for special management of activities that threaten the natural values, such as lava and cinder removal. This special management would continue to apply whether or not the WSA was designated wilderness.

Issues

Issues relating to each WSA were raised by BLM and the public during the wilderness inventory and EIS planning and scoping process. These issues concern both the effects of wilderness designation on existing and potential land uses or resources in the WSA, as well as the effects of existing and potential land uses or resources on wilderness values. Land uses or resources raised as issues specifically for this WSA include:

- the area's crucial deer winter range and good wildlife habitat,
- livestock grazing in the area and related use of the road to Devils Garden, and
- slab lava removal from the area.

Description of the Alternatives

The following alternatives are analyzed:

- all wilderness
- enhanced wilderness
- partial (preferred alternative)
- no wilderness/no action

All Wilderness

The all wilderness alternative would recommend all 28,720 acres of public land in the WSA suitable as wilderness (see map 2). The dead-end road into The Garden (the 3,900 acres of lava-free land in the north part of the WSA) would remain open.

Enhanced Wilderness

The enhanced wilderness alternative would recommend 27,200 acres of the WSA suitable as wilderness (see map 3). In addition, an attempt would be made to acquire 960 acres of split-estate lands along the east side of the WSA. These parcels could be acquired through purchase or exchange with willing owners. Assuming acquisition of these parcels, the total area recommended suitable as wilderness under this alternative would be 28,160 acres.

The dead-end road into The Garden would be closed; however, regulated vehicle use would be allowed for operation and maintenance of a livestock watering well, if there were no practical alternative to use of vehicles.

A total of 1,520 acres along the east, west and northwest boundaries would be recommended nonsuitable for wilderness.

On the east, the boundary would include split-estate lands and would be aligned on BLM roads and roads associated with the Bonneville Power Administration (BPA) and Pacific Power & Light (PP&L) powerlines east of the WSA. On the northwest and west, the boundary would follow ways around the lava flow which would represent a better-defined physical boundary than the current land ownership boundaries.

Partial (Preferred Alternative)

The partial alternative would recommend 24,800 acres of the WSA suitable as wilderness (see map 4). In addition, an attempt would be made to acquire 960 acres of split-estate land along the east side of the WSA. These parcels could be acquired through purchase or exchange with willing owners.

Assuming acquisition of the split-estate land, total area recommended suitable under this alternative would be 25,760 acres.

This alternative would recommend 3,920 acres nonsuitable as wilderness. The nonsuitable lands are a peninsula of the lava flow in the northwest corner of the WSA, a block of land in the southeast corner of the WSA just north of Cougar Mountain, and the same lands outside the lava flow along the northwest and west sides of the WSA that would be recommended nonsuitable in the enhanced wilderness alternative.

The boundaries between the suitable and nonsuitable portions would be a combination of legal subdivisions and the edge of the lava flow in the northwest corner and west side, and legal subdivisions in the southeast corner. The dead-end road into The Garden would be closed, except that regulated vehicular use would be allowed for operation and maintenance of a livestock watering well if there were no practical alternatives to use of the vehicles.

No Wilderness/No Action

The no wilderness/no action alternative would recommend the entire WSA nonsuitable as wilderness. It represents the situation most likely to occur without wilderness designation. The area would be managed according to the current land use plan, which includes the following features relevant to this analysis:

- allow for slab lava sales, and
- allow continued livestock grazing in portions of the WSA.

Table 1 summarizes the proposed management of the WSA under each alternative.

Table 2 summarizes the environmental consequences of each alternative.

Manageability of the Area as Wilderness

The all wilderness alternative would be manageable as wilderness with some minor boundary enforcement problems on the east (adjacent split-estate lands) and on the north. This problem would be most apparent during hunting season when the trail systems receive high use. If designated wilderness, the WSA boundary on the north would be signed, with trails going beyond the signs into the wilderness area. If minerals on the split-estate parcels were developed, it could make management of the wilderness difficult because the split-estate protrudes into the area.

The enhanced wilderness alternative would be manageable as wilderness. It would place the boundary on physical features where enforcement would be easier and public recognition of the boundary would be greater. This would improve manageability. This alternative would also resolve potential conflicts with activities on split-estate lands on the east side of the WSA.

The partial alternative would be manageable as wilderness. Lava sales would be limited to lands that could be patrolled by vehicles outside the wilderness to assure compliance with sales contracts.

Table 1. Summary of Proposed Management Under Each Alternative, Devils Garden Lava Bed WSA (OR-1-2)

Proposed Management	All Wilderness	Enhanced Wilderness	Partial	No Wilderness/ No Action
Acres Designated as Wilderness	28,720	27,200	24,800	0
Acres Closed to ORVs by Wilderness Designation	28,720	27,200	24,800	0
Miles of Roads Closed	0	2	2	0
Miles of Ways Closed	18	6	6	0
Acres of Split Estate Acquired[1]	0	960	960	0
Acres Withdrawn from Mineral Location and Leasing by Wilderness Designation	28,720	27,200	24,800	0
Structural Wildlife Projects Developed: Catchments & Guzzlers (number)	0-3	0-3	0-3	3
Vegetative Manipulation for Wildlife: Brush Control with Seeding (acres)	0	0	0	240

[1] Upon acquisition, these additional lands would be incorporated into the wilderness area, closed to vehicle use, and withdrawn from mineral location and leasing.

Rationale for the Selection of the Preferred Alternative

The partial alternative is preferred because it would preserve wilderness values in the portion of the WSA with the greatest number and variety of wilderness values and it would allow removal of slab lava from the portion of the WSA with the highest quality lava. Wilderness designation would preserve volcanic features that are of considerable interest to the scientific and educational communities, and it would ensure that the outstanding opportunities for solitude and primitive recreation would not be impaired. This alternative would allow the demand for slab lava to be met.

Affected Environment

This section discusses only those activities or resources which influence the character of the study area, or that may be affected by the alternatives.

Wilderness Values

Naturalness

Almost all of the Devils Garden Lava Bed WSA is in a natural condition. The lava flows are extremely rugged and have generally precluded any development. Topography and vegetation limit the visibility of any man-made features to a very small area.

Man-made features in the WSA include 18 miles of ways, a homestead site with 2 old houses, a well and an associated corral, and approximately 1,000 acres seeded with crested wheatgrass. The man-made features influence less than one third of one percent of the WSA. (The area of influence is an estimate of the acreage within the WSA from which these man-made features can be seen.)

The vehicle ways are primarily in The Garden and on the periphery of the lava flow, but many are

Table 2. Summary of Environmental Consequences of Alternatives, Devils Garden Lava Bed WSA (OR-1-2)

Resource or Activity	All Wilderness	Enhanced Wilderness	Partial (Preferred Alternative)	No Wilderness/No Action
Wilderness Values	Would add 28,720 acres to the NWPS. Preserve rugged, geologically recent lava flow, diverse vegetation, scientifically and educationally important geologic features, and wildlife habitat on entire area. Closure of 18 miles of ways would increase naturalness and enhance opportunities for solitude and primitive recreation. The area would be manageable as wilderness.	Would add 28,160 acres to the NWPS, assuming 960 acres of split-estate could be acquired. 1,520 acres in WSA would be recommended non-suitable for wilderness. Preserve most natural features as in all wilderness, eliminate impacts to solitude and primitive recreation in garden and on east side. Closure of 6 miles of ways would enhance wilderness values. Development of minerals in nonsuitable portion could impair wilderness values. The area would be manageable as wilderness.	Would add 25,760 acres to NWPS, assuming 960 acres of split-estate could be acquired, and preserve wilderness values on those lands. Would recommend 3,920 acres in WSA nonsuitable for wilderness. Developement of minerals in the nonsuitable portion could adversely affect wilderness values. Closure of 6 miles of ways would enhance wilderness values. The area would be manageable as wilderness	Mineral and wildlife habitat developments would impair natural values in roughly half of the WSA, and mineral development activities would impair oppotunities for solitude and primitive recreation.
Energy and Mineral Development	Development precluded on 28,720 acres, including 28,720 acres with moderate potential for metals and geothermal, 270 acres with high and 2,500 acres with moderate potential for slab lava, and 40 acres with high potential for cinders.	Development precluded on 27,200 acres, plus an additional 960 acres, if acquired. Includes 27,200 acres with moderate potential for metals and geothermal. Slab lava and cinders same as all wilderness.	Development precluded on 24,800 acres, plus an additional 960 acres, if acquired. Includes 24,800 acres with moderate potential for metals and geothermal, 140 acres with high potential and 920 acres with moderate potential for slab lava. None of the area rated high for cinders is involved.	No impact.
Vegetation	Vegetation preserved.	Vegetation preserved in suitable area.	Wildlife projects would change 240 acres to non-native grasses and reduce diversity. Vegetation preserved in suitable area.	Wildlife projects would change 240 acres to non-native grasses and reduce diversity. Succession set back in timber harvest area.
Wildlife	Wildlife habitat preserved. Opportunity to improve forage quality foregone on 240 acres. No significant change in wildlife numbers.	Same as all wilderness. Wildlife habitat preserved in suitable area.	Wildlife habitat preserved in suitable area. Improve forage value on 240 acres. No significant change in wildlife numbers.	Improve forage value on 240 acres. No significant change in wildlife numbers.
Livestock Grazing	Vehicle use restricted unless no practical alternative.	Same as all Wilderness.	Same as all Wilderness.	No impact.
Recreation Use	Minor decline in vehicle-oriented use but net increase in overall recreation use.	Same as all wilderness.	No impact on vehicle use. Net increase in overall recreation use similar to all wilderness and enhanced wilderness alternatives.	No impact on vehicle use. Net increase less than other alternatives.
Economic Value and Local Income	Decrease in annual economic value could range from $1,046 to $197, depending on what proposed projects would be allowed in wilderness. Local personal income would not change. Both sets of figures exclude unknown economic effects of mineral development and of unquantified changes in recreation use. The maximum increase in transportation costs to ranchers with grazing permits would be $197.	Same as all wilderness.	Change in annual economic value would be a decrease of $1,393. Local personal income would not change. Both sets of figures exclude unknown economic effects of mineral development and of unquantified changes in recreation use. The maximum increase in transportation cost to ranchers with grazing permits would be $197.	Decrease in economic value by $1,196 and no change in local personal income from construction of proposed projects.

barely locatable on the ground and are not visible from the side due to vegetation. The homestead site in The Garden, with two old houses, a well and an associated corral, affects approximately forty acres. Trees and topography limit the effects of these features.

Most of the crested wheatgrass seedings have regrown with brush and native plants so as to be generally indistinguishable from the native bunchgrass areas. The seedings are located in The Garden, on Hogback Butte, and in the southeast corner of the WSA. Only the southeast corner seeding has a distinct appearance of having been seeded. There are two big game and two bird guzzlers (small wildlife watering devices) in the area.

Three parallel high voltage transmission lines along the east side of the WSA are the most visible of man's works outside the WSA which can be seen from within the area. The lines are noticeable from much of the south half of the study area across the pahoehoe flow.

Opportunities for Solitude or Primitive and Unconfined Types of Recreation

The study area offers outstanding opportunities for solitude and primitive recreation.

It is possible to obtain an immediate sense of solitude anywhere within the lava flows. In the north part of the WSA, terrain and vegetation provide solitude just a few feet inside the area. On the southern flows, highly broken terrain with sinks and draws make it very easy to find isolation. In The Garden, the more open sage country has sufficient breaks in terrain to allow for isolation in this portion of the WSA as well.

The cinder cones offer additional opportunities for solitude in The Garden. On the cinder cone known as the "Little Garden" in the northeast part of the WSA, a person looking out over the expanses of the lava flow, and surrounded by ponderosa pine, can experience considerable solitude.

Opportunities for primitive recreation include cave exploring, hiking, photography, nature study (especially with regard to geology), camping, hunting, and general sightseeing. The diversity of landscape in the area offers sufficient variety for extended stays in the area, with a spectrum of recreational opportunities. The north part of the area is the most rugged to travel across and has the densest vegetation. The southern part and The Garden are more open and offer better terrain for campsites.

Special Features

The Devils Garden Lava Bed WSA contains numerous geologic features of high interest to the educational and scientific communities, especially regarding aspects of volcanism. The area is often used for university field courses (see Energy and Minerals section). The WSA is in an ecotone between the sagebrush steppe and ponderosa pine forest and therefore contains an assemblage of plants found in both ecosystems. The WSA also contains kipukas — areas of undisturbed native vegetation in lava fields. The entire WSA is located in crucial deer winter range.

The WSA is part of a wintering area for the northern bald eagle, which is federally listed as threatened in Oregon.

Diversity in the National Wilderness Preservation System (NWPS)

According to the Bailey-Küchler system of classifying ecosystems, the Devils Garden Lava Bed WSA is located in the Intermountain Sagebrush Province, with a potential natural vegetation of sagebrush-steppe with juniper. Though the majority of the WSA is sagebrush and juniper, the north end of the area contains considerable ponderosa pine.

Vegetative communities listed in the High Lava Plains and Columbia Basin section of the Oregon Natural Heritage Plan and occurring in the WSA are: ponderosa pine/big sagebrush, ponderosa pine/bitterbrush/Idaho fescue, ponderosa pine/western juniper/ big sagebrush, western juniper/big sagebrush/bluebunch wheatgrass, western juniper/bluebunch wheatgrass, western juniper, Idaho fescue, western juniper/big sagebrush/bitterbrush, big sagebrush/Idaho fescue, mountain mahogany, and aspen.

The Devils Garden WSA is located within 5 hours; driving time of several standard metropolitan statistical areas with populations over 100,000: Eugene/Springfield, Salem, Portland and Medford, Oregon.

Energy and Mineral Development

Energy and mineral resources were evaluated by BLM using available geologic data, results of a BLM geologic/geochemical study, and data provided by Engineer's International, Incorporated (EII), a consulting firm under contract with BLM. The data is contained in an EII report titled "Geological Investigation and Mineral Inventory of Devil's

Garden, Four Craters, and Squaw Ridge in Lake County, Oregon."

The WSA has been classified according to a rating system that indicates both the potential for occurrence (geologic favorability) of certain minerals, as well as the quantity and quality of data on which the rating is based (confidence level). A description of the rating system is provided in the Statewide EIS volume.

Geothermal energy is the main potential energy resource in the area. Although no specific areas of geothermal potential have been identified in the WSA, the entire WSA is considered moderately favorable for the occurrence of geothermal resources, based upon recent volcanism and above-normal heat flow (characteristic of most of southeastern Oregon).

The entire WSA is considered to be moderately favorable for the occurrence of metals. This classification is based upon anomalous values obtained from geochemical samples taken from silicic vent rocks within and around the WSA; epithermal (low-temperature) mineralization is associated with silicic volcanic rocks in other areas.

Portions of the WSA are rated highly favorable and moderately favorable for the occurrence of slab lava. A small portion is considered highly favorable for the occurrence of cinders. Slab lava located around the edges of the lava flow is readily exploitable, while interior deposits lack good access.

In the past, slab lava has been sold and taken illegally from the Devils Garden flow. Numerous inquiries to BLM's Lakeview District concerning purchasing slab lava attest to the demand for this decorative stone. Except for the Devils Garden, Squaw Ridge, and, to a lesser extent, the Four Craters area (all wilderness study areas), stone of this quality does not appear to be available in the area for hundreds of miles.

Table 3 gives the mineral potential classifications for the WSA. Map 5 shows the areas rated high for slab lava and cinders, and moderate (medium) for slab lava.

Mercury, zinc, and silver are strategic and critical minerals having a moderate favorability of occurrence; but there are no known strategic and critical mineral deposits within the WSA.

The main mineral deposits within the WSA consist of slab lava (decorative stone). Other mineral deposits being actively exploited within 10 miles of the WSA include sand, gravel, and cinders.

Table 3. Classification of Energy and Mineral Potential, Devils Garden Lava Bed WSA (OR-1-2)

Commodity	Area	Classification Level	Confidence Level
Metals (gold, silver, zinc, mercury)	Entire WSA	3	B
Geothermal	Entire WSA	3	B
Uranium/Thorium	Entire WSA	1	A
Coal	Entire WSA	2	B
Oil/Gas	Entire WSA	2	A
Limestone	Entire WSA	1	C
Bentonite	Entire WSA	1	B
Diatomite	Entire WSA	2	B
Zeolites	part of area (not shown on map)	2	B
	Rest of WSA	1	B
Perlite	part of area (not show on map)	2	B
	Rest of WSA	1	B
Slab lava	See map 5	4	D
	See map 5	3	D
	Rest of WSA	2	C
Cinders	See map 5	4	D
	Rest of WSA	1	C

Legend:
Class 1 - Lack of indications of favorability
Class 2 - Low favorability
Class 3 - Moderate favorability
Class 4 - High favorability

Confidence Level A - Insufficient data or no direct evidence
Confidence Level B - Indirect evidence available
Confidence Level C - Direct evidence but quantitatively minimal
Confidence Level D - Abundant direct and indirect evidence

As of January 1, 1984, there were no mining claims and no oil and gas or geothermal leases in the WSA.

The bulk of the WSA is characterized by Quaternary basalt flows and other volcanic features such as spatter cones, lava tubes, and cinder cones. The surface rocks of the fringe of the WSA are composed of older (Quaternary to Tertiary) basalt. Silicic volcanic rocks of Quaternary to Tertiary age are present around and within the WSA. The subsurface geology is largely unknown, but pre-Tertiary marine sedimentary rocks may exist at depth.

Vegetation

The WSA consists generally of ponderosa pine, western juniper, and big sagebrush/bunchgrass communities. Other trees and shrubs in the WSA include mountain mahogany, quaking aspen, bitterbrush, wax current, desert-sweet, rabbitbrushes and glad oceanspray. The shrubs form dense thickets in the lava crevices, especially in the burned areas. The plants in the WSA occupy every available soil pocket in the lava material.

Bunchgrasses are abundant in the WSA, forming dense stands of bluebunch wheatgrass on the drier southern slopes of the cinder cones and Idaho fescue on the northern slopes. This is especially evident in the Little Garden area. The Devils Garden area contains big sagebrush, rabbitbrush, crested wheatgrass, Indian ricegrass, needle grasses and scattered junipers.

The vegetative communities in the WSA vary from early seral in the Devils Garden to late seral and near-climax conditions in the Little Garden area. (Seral refers to a stage of ecological condition based on the differences between the present plant community and climax vegetation, the relatively stable, final stage in plant succession.)

Wildlife

The Devils Garden Lava Bed WSA is located entirely within a crucial deer winter range. Most of the herd winters in the lava area and moves to the Deschutes National Forest the rest of the year; but some deer are year-round residents. Some 5,000 deer use this WSA as all or part of their winter habitat. The area is important for both the excellent thermal cover offered by the lava flows as well as for forage. Forage conditions are variable, but average condition is fair.

The WSA also supports small numbers of elk coming south in winter from the Deschutes National Forest. Other wildlife in the area include small mammals, numerous bird species and reptiles. There are occasional reports of bear and cougar appearing in the area. The WSA is part of a wintering area for the northern bald eagle, which is federally listed as threatened in Oregon.

Present wildlife developments include two big game guzzlers and two bird guzzlers. The bird guzzlers are located on Hogback Butte. One of the big game guzzlers is on the northeast edge of the lava flow and the other is in the Little Garden area.

The principal land treatment in the area is the Cougar Mountain-Hogback Butte seeding on the east side of the WSA and just outside the WSA. The project was a wildlife rehabilitation project. Because of the area's importance to the deer herd, the Oregon Department of Fish and Wildlife contributed funding to BLM for the project.

Three additional big game guzzlers are proposed for the WSA: two in the Devils Garden and one on the west central portion of the lava flow. Burning followed by seeding of approximately 240 acres along the west-central edge of the lava flow is also proposed. It would be in two sections, 100 and 140 acres respectively, spaced one-half to two miles apart. The areas would be prescription burned and seeded to a Siberian wheatgrass/Sherman big bluegrass-alfalfa mixture. Bitterbrush seedings, container grown or transplants, would be hand-planted in the areas.

These projects are not intended to increase the number of deer in the Devils Garden herd, but to improve the diversity and quality of the forage, to provide better nutritional condition and hopefully reduce deer population fluctuations.

Livestock Grazing

Portions of five grazing allotments and all of one allotment are included in the Devils Garden Lava Bed WSA. Table 4 shows existing and potential livestock use in AUMs (animal unit months, the amount of forage needed to sustain one cow and a calf, or equivalent animals, for one month).

An existing livestock project (among the man-made features listed in the Naturalness section) is the well at the homestead site.

The Devils Garden grazing allotment does not have permanent livestock use attached to it. The allotment is located in The Garden on the west side of the WSA. Grazing in the allotment is authorized on a temporary, annual permit basis. The allotment is reserved as an emergency use allotment in case of a fire or other emergency in another allotment. A permit for grazing in the allotment has been issued in 4 of the last 5 years.

No additional improvements or increases in forage are proposed in the WSA. However, livestock

Table 4. Existing Livestock Use, Devils Garden Lava Bed WSA (OR-1-2)

Grazing Allotment	Licensed AUMs in Allot.	Period of Use	Percent of Allot. in WSA	Current Actual Use in WSA (AUMs)
Fremont (No. 900)	1,970	4/01-09/30	2.6	84
Fremont No. 905)	805	4/01-10/31	5.0	82
Webster Field (No. 906)	112	5/01-11/15	33.1	54
Cougar Mtn. (No. 908)	616	4/01-02/15	4.9	76
Hogback Bt. (No. 910)	680[1]	4/15-12/15	30.2	331
Devils Garden (No. 907)[2]	0	4/15-09/30	100.0	662
Totals	4,183			1,289

[1] Currently not in use due to private land activity affecting grazing privilege.
[2] Temporary non-renewable allotment.

operators have indicated a desire to contribute toward additional improvements and increased forage production.

Grazing operators in the WSA currently utilize the vehicle ways for nearly all livestock management except gathering of livestock at the end of the use period. This is usually accomplished by horseback.

Wood Products Harvest

There is 1.5 mbf (thousand board feet) of ponderosa pine in the north end of the WSA and in the Little Garden which are difficult to get to and therefore are uneconomical to harvest. Due to difficulty in reforestation, this area is excluded from planned timber harvest. It could be possible, however, to include a salvage timber sale in this area with a Forest Service sale on adjoining lands to make a sale unit.

Recreation Use

The principal recreation activity in the WSA is exploration of the unique lava features. There is considerable camping in the area near Derrick Cave, the Blowouts, and the border area near the Deschutes National Forest boundary. There are good camping sites on the east side of the area from the Deschutes boundary south to Hogback Butte and Derrick Ranch.

Some hunting occurs in the Garden and around the periphery of the WSA. Derrick Caves is the most used area for cave exploration and study.

Vehicle-oriented recreation in the WSA is extremely limited due to terrain. Much of the recreation use in the WSA is primitive-type recreation.

Economic Value and Local Income

Livestock grazing and recreation are the only resource outputs which generate economic activity in this WSA. The WSA currently produces 1,289 animal unit months (AUMs) of livestock forage and an unknown amount of recreation activity annually. In addition, 287 AUMs of livestock use is authorized on a temporary basis. As of January 1, 1984, there were no oil and gas leases or geothermal leases on the WSA.

The economic value of existing outputs amounts to $11,883 annually, and local personal income generated by existing outputs amounts to $16,185 annually. The terms economic value and local personal income are discussed in the Statewide EIS volume.

Environmental Consequences

This section discusses the environmental consequences of implementing each of the alternatives. Resources and activities not significantly affected by any of the alternatives are not discussed. General impact conclusions applicable to all WSAs, including impact conclusions based on speculative future developments (developments which are possible, but are not currently proposed), are discussed in the Statewide EIS volume. That volume also discusses certain assumptions that were made for this analysis.

Effects on Wilderness Values

The **all wilderness alternative** would add 28,720 acres to the National Wilderness Preservation System (NWPS). It would preserve the wilderness values of the rugged northern lava flow, the Devils Garden, the southern pahoehoe flow from the Garden to Cougar Mountain, as well as wildlife habitat, opportunities for primitive recreation and solitude, and the area's vegetative diversity.

Split-estate land adjacent to the WSA on the east side would be subject to developments for livestock, wildlife or minerals. This could have an adverse effect on wilderness values in the WSA because of the irregular pattern of land ownership. The split-estate parcel would be bordered on three sides by wilderness, and developments on the parcel would be visible from the wilderness.

Closure of 18 miles of ways would allow the ways to revegetate and enhance the naturalness of the area. It also would improve opportunities for solitude and primitive recreation.

The **enhanced wilderness alternative** would add 28,160 acres to the NWPS, assuming acquisition of the 960 acres of split-estate land. This alternative would preserve most of the wilderness values preserved in the all wilderness alternative. It would prevent adverse effects from development of mineral resources on the east-side split estate. The alternative would also close The Garden to vehicle access. Closure of 6 miles of ways would enhance wilderness values.

Wilderness values would be impaired if minerals or other resources were developed on the 1,520 acres recommended as nonsuitable in the enhanced wilderness alternative.

The **partial alternative** would add 25,760 acres to the NWPS, assuming acquisition of 960 acres of split-estate land. Most of the effects of the alternative on wilderness values would be the same as those of the enhanced alternative. The exception would be on the 3,920 acres recommended as nonsuitable, where slab lava could be removed. Noise from the machinery and vehicles used to remove the lava would have short-term adverse impacts on opportunities for solitude in nearby areas. The naturalness of the slab-lava-removal areas would be reduced, but these areas would be restricted in size and generally not visible from the area recommended suitable for wilderness. Exploration for and development of geothermal resources and metallic minerals could adversely affect wilderness values in any portion of the area recommended as nonsuitable for wilderness. The naturalness of the nonsuitable portion would be impaired by proposed vegetative manipulation projects to change deer habitat.

Closure of 6 miles of ways would enhance wilderness values.

Under the **no wilderness/no action alternative,** wilderness values could be adversely affected by removal of slab lava and cinders, explanation for and development of geothermal resources and metallic minerals, and vegetative manipulation projects to change deer habitat. An ACEC management plan for this area could mitigate some impacts of development activities. The purpose of the plan would be to protect valuable natural resources while following multiple use principles.

Effects on Energy and Mineral Development

Areas designated wilderness would be withdrawn from mineral exploration and development. Table 5 shows the acres that would be withdrawn under each alternative, including acres rated high and moderate for certain minerals.

Table 5. Effects of Alternatives on Energy and Mineral Development, Devils Garden Lava Bed WSA (OR-1-2)

	Acres Withdrawn			
	All Wilderness	Enhanced Wilderness	Partial	No Wilderness/ No Action
Total Acres	28,720	27,200[1]	24,800[1]	0
Metals rated moderate (gold, silver, zinc, mecury)	28,720	27,200	24,800	
Geothermal rated moderate	28,720	27,200	24,800	0
Slab lava rated high	270	270	140	0
Slab lava rated moderate	2,500	2,500	1,920	0
Cinders rated high	40	40	0	0

[1] Development also precluded on an additional 960 acres if split-estate land is acquired as proposed under this alternative.

Effects on Vegetation

Areas designated wilderness would not be subject to most surface disturbing activities. Vegetation dependent upon the existing undeveloped environment would thus be maintained under the **all wilderness** and **enhanced wilderness alternatives.**

The **partial alternative** and **no wilderness/no action** alternative would allow the proposed 240-acre burn-and-seed, although it would have to be modified slightly under the partial to exclude a small area in the suitable portion. The project would change the vegetative community from native grassland and brush to crested wheatgrass, a non-native grass, and reduce vegetative diversity by temporarily eliminating shrubs and forbs. Lifestock grazing patterns in and near the project could also reduce diversity.

The no wilderness/no action alternative would also allow timber salvage harvest in the north part of the WSA. If such salvage occurred, vegetative succession would be set back.

Effects on Wildlife

Wildlife habitat would be preserved in areas designated wilderness.

None of the alternatives is expected to have a significant impact on the number of deer using the winter range. The **all wilderness** and **enhanced wilderness alternatives** would preclude vegetative manipulation projects (burn-and-seed) designed to improve forage in the area and improve nutritional value of winter feed. The three proposed guzzlers might or might not be allowed depending on a site-specific assessment of whether they conform to Wilderness Management Policy.

Wildlife projects implemented under the **partial alternative** or **no wilderness/no action alternatives** would enhance forage and reduce winter losses in stress years (harsh winters), but would not increase average herd size.

Effects on Livestock Grazing

Under the **all wilderness, enhanced wilderness,** and **partial alternatives,** vehicle access for livestock management would be precluded in the suitable portions, unless there were no practical alternative to using vehicles.

Under the **no wilderness/no action alternative,** there would be no restrictions on vehicle use.

Effects on Recreation Use

If all or part of the WSA were to become wilderness, some increase over existing recreation use of the area would be expected. Word-of-mouth discussion about the area has brought increases over the last few years, and increased public awareness of the WSA as a designated wilderness would add to this trend.

The **all wilderness alternative** would preclude recreation-related vehicle access within the WSA. This would result in minor declines, as use is slight. A net increase in overall recreation use would occur due to increased primitive recreation use.

Closure of the dead-end road under the **enhanced wilderness alternative** would reduce vehicle use beyond the reduction that would occur in the all wilderness alternative, but that decline would also be minor. A net increase in overall recreation use, similar to that under the all wilderness alternative, would occur.

The **partial alternative** would affect vehicle use in the same manner as the enhanced wilderness alternative. Although it would substantially reduce primitive recreation potential in The Garden and on the south half of the lava flow, it would still lead to a net increase in overall recreation use similar to that under the all wilderness and enhanced wilderness alternatives.

Under the **no wilderness/no action alternative,** use of the area would still be expected to increase in the future as population in the Bend area and Christmas Valley areas increases and residents pursue outdoor recreation opportunities. With the limited vehicle access in the WSA, the recreation use increases would be of primitive or semi-primitive types. The increases would be less than under the other alternatives.

Effects on Economic Value and Local Income

The economic effects for the alternatives are presented in tables 6 and 7. Table 6 shows the effects on economic value and table 7, the effects on local personal income. It is not known at this time whether individual proposed structural developments, such as the guzzlers proposed for this WSA, would be constructed if the area were designated wilderness. It is known that vegetative manipulation projects, such as the proposed burn-and-seed would not be allowed.

The columns for the wilderness alternatives show the effects as a range of values dependent upon whether structural improvements and/or grazing operator access were allowed.

Currently, there is little dependence on vehicles for livestock management in the study area. The wilderness alternatives would restrict such vehicle use unless there were no practical alternative. The maximum impact from road closures upon the grazing operator in the WSA would be an increase in cost of about $197 per year.

Table 6. Effects of Alternatives on Annual Economic Value, Devils Garden Lava Bed WSA (OR-1-2) (1981 price levels)

Item	Unit of Measure	All Wilderness	Enhanced Wilderness	Partial	No Wilderness/ No Action
VALUE OF PLANNED INVESTMENTS[1]					
Investments[2]	$	-849 to 0	-849 to 0	-1,196	-1,196
Net Economic Value	$	-849 to 0	-849 to 0	-1,196	-1,196
VALUE OF OTHER EXPECTED CHANGES IN OUTPUTS					
Reduced access[3]	$	-197	-197	-197	0
VALUE OF TOTAL EXPECTED CHANGES IN OUTPUTS					
All categories	$	-1,046 to -197	-1,046 to -197	-1,393	-1,196

[1] Vegetative manipulation projects involving up to $4,380 total expenditures, and structural projects involving up to $9,000. Amounts shown in the table represent combined results of both types of projects, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

[2] Average annual cost of investment expenditures amortized at 7.875% over 50-year period.

[3] Additional cost (shown as negative value) due to restriction of vehicular access for livestock operator.

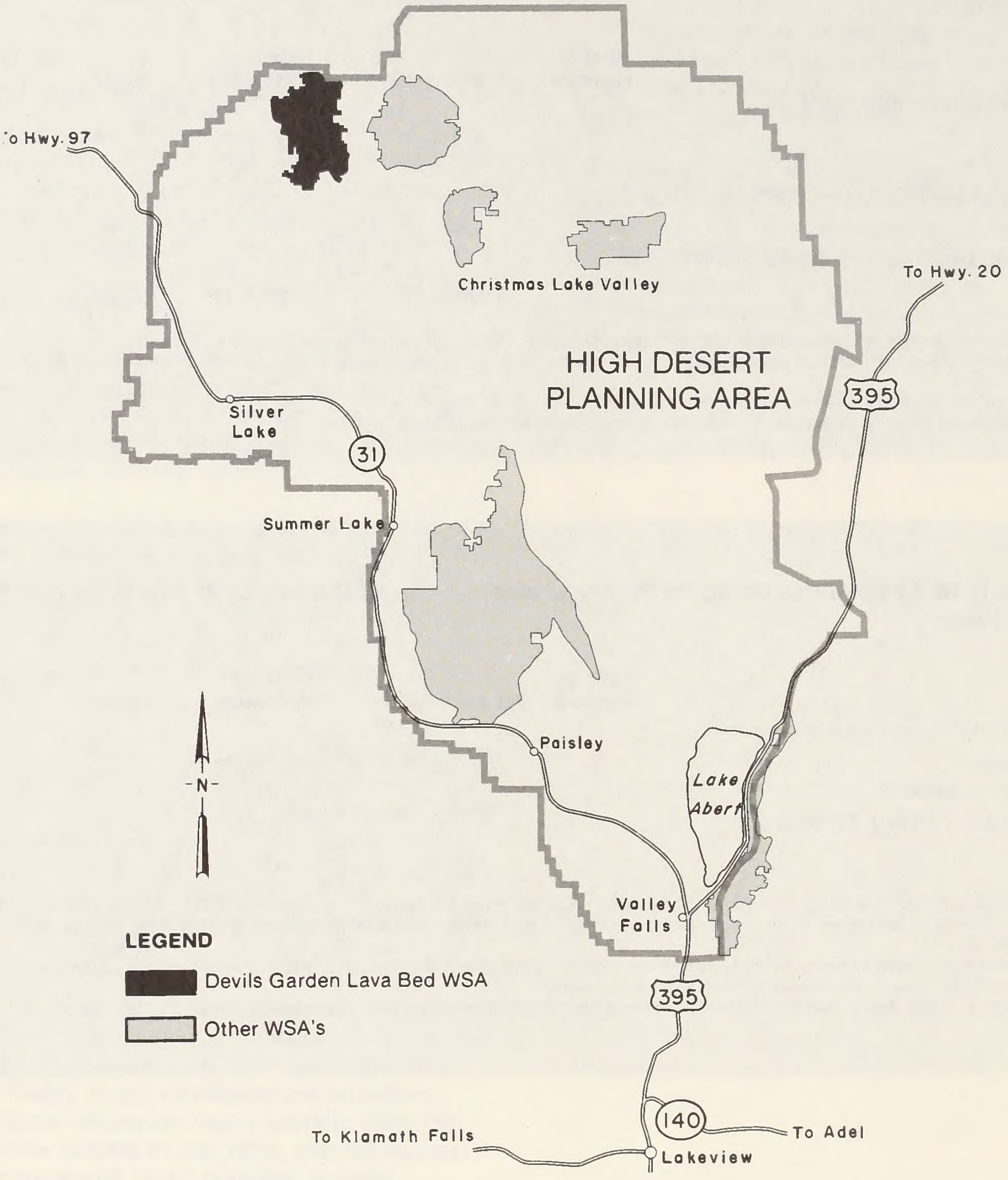
Table 7. Effects of Alternatives on Local Personal Income, Devils Garden Lava Bed WSA (OR-1-2) (1981 price levels)

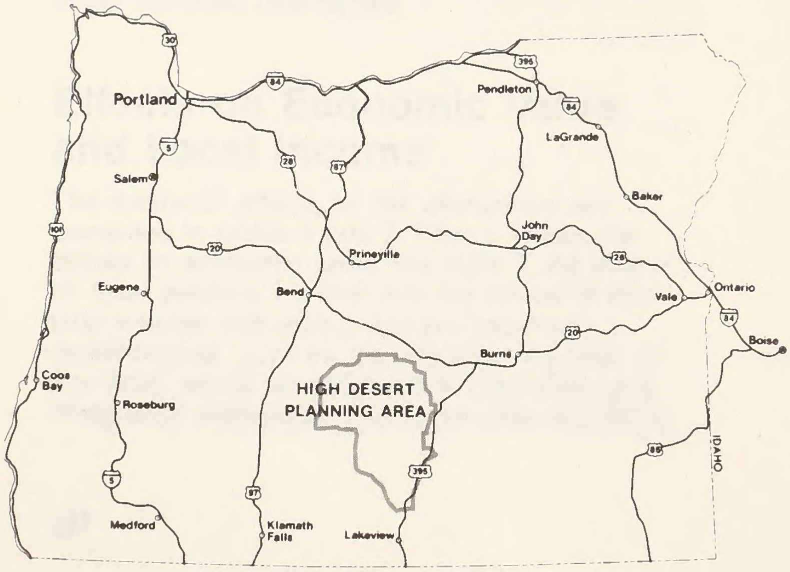
Item	Unit of Measure	All Wilderness	Enhanced Wilderness	Partial	No Wilderness/ No Action
INCOME FROM PROPOSED INVESTMENTS[1]					
Construction activity[2]	$	0 to +1,113	0 to +1,113	+1,654	+1,654
Net change due to investment		0	0	0	0
INCOME FROM ALL OUTPUT CHANGES					
All categories[3]	$	0	0	0	0

[1] Vegetative manipulation projects involving up to $4,380 total expenditures, and structural projects involving up to $9,000. Amounts shown in the table represent combined results of both types of projects, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

[2] Local personal income generated annually during assumed 5-year construction period. This amount cannot be added to the income resulting from grazing and hunting activity because it is not sustained over the analysis period.

[3] Detail may not sum to "Total" due to rounding. Total omits income from construction which is limited to 5-year period. See footnote 2.





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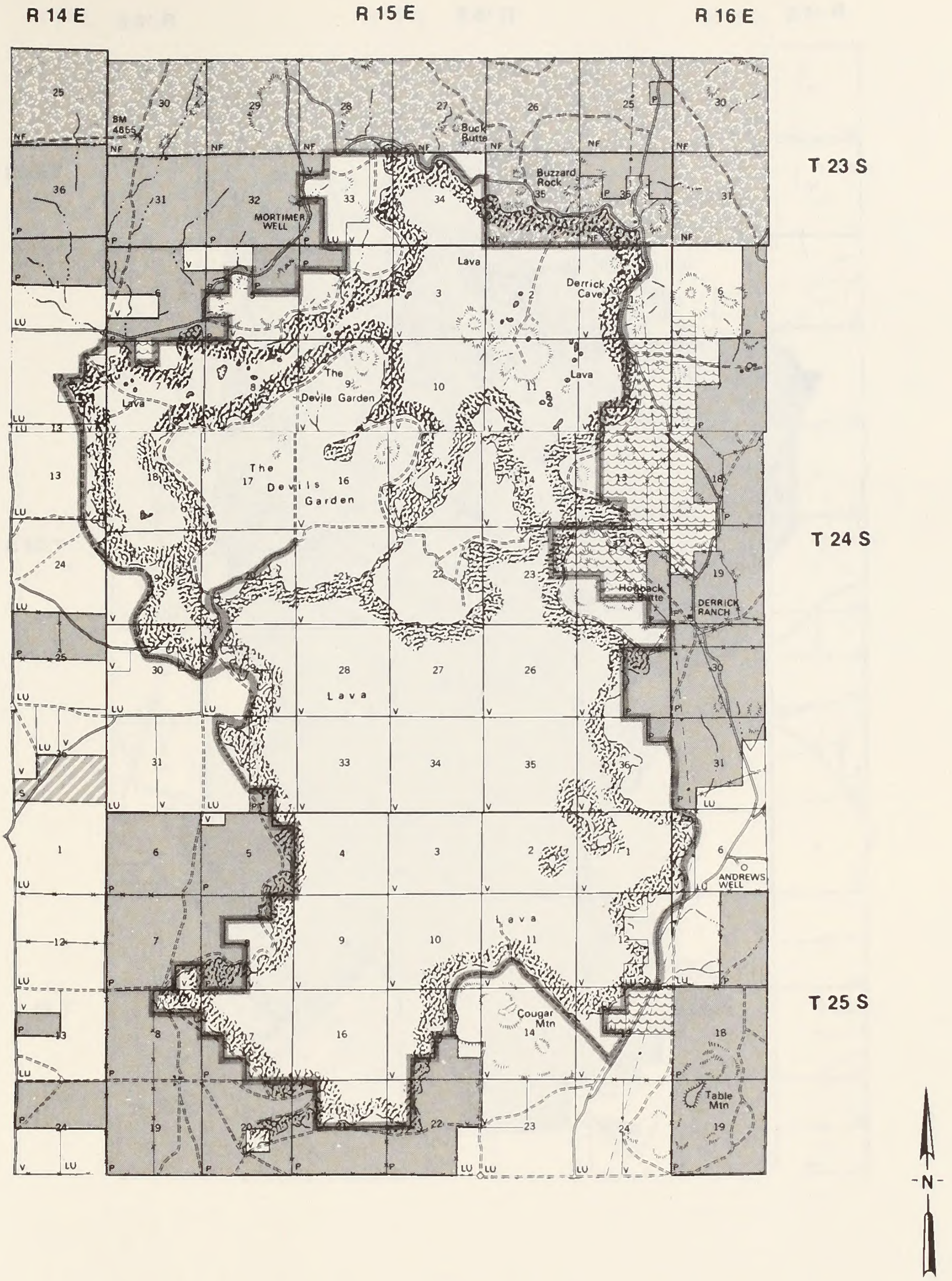
Lakeview District

Devils Garden Lava Bed WSA
OR-1-2

LOCATION MAP

10 0 10 MILES

MAP 1



LEGEND

- ▬ Wilderness Study Area Boundary
- ☐ Bureau of Land Management
- ▨ State
- ■ Private
- ▒ U.S. Forest Service
- ≋ BLM Surface State or Private Subsurface (Split Estate)
- ▓ Edge of Lava

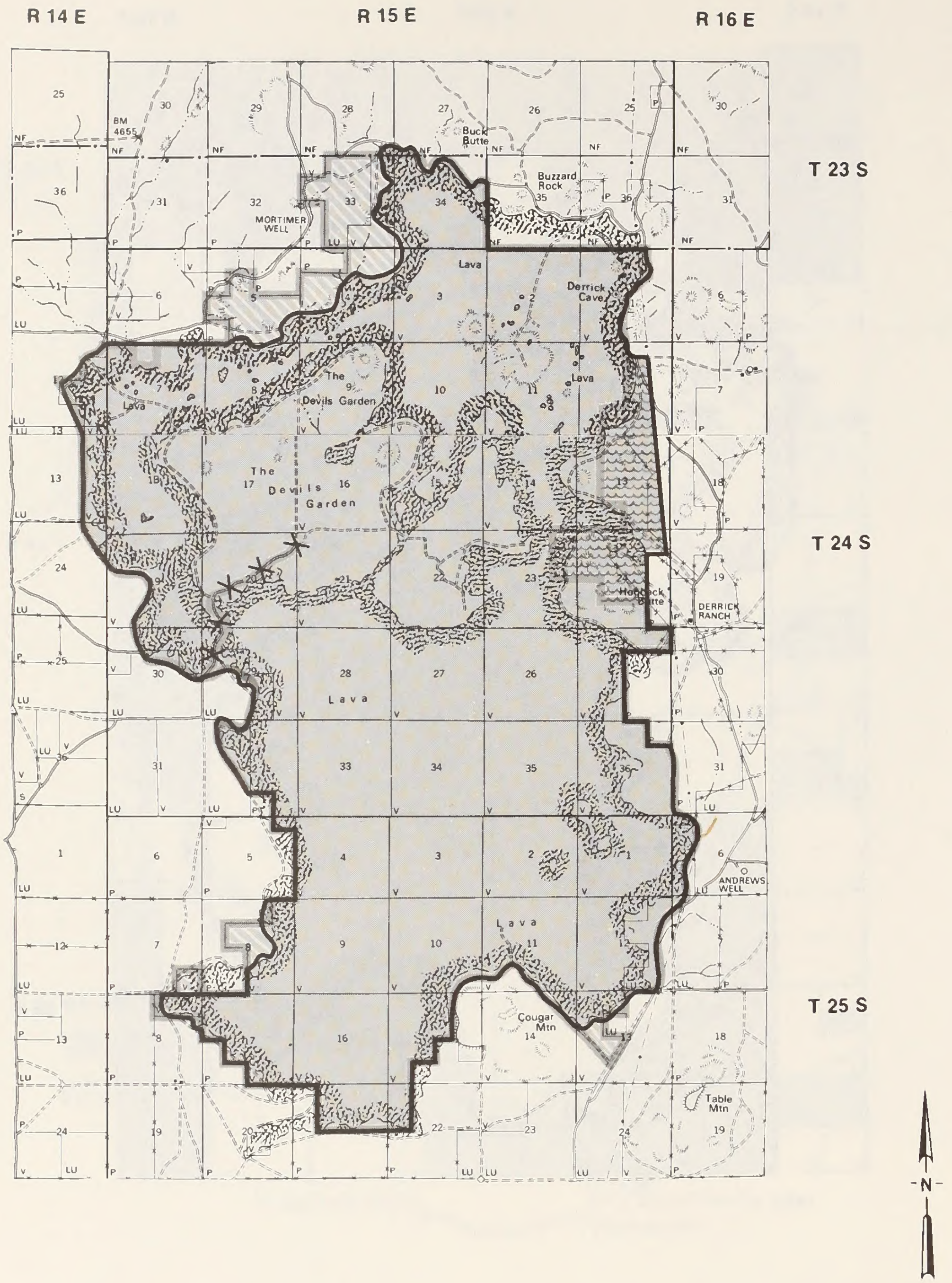
U. S. Department of the Interior
Bureau of Land Management
Lakeview District

Devil s Garden Lava Bed WSA
OR-1-2

LAND OWNERSHIP

1 0 1 2 MILES

MAP 2



LEGEND

▬ Wilderness Study Area Boundary

▢ Recommended Suitable for Wilderness

▨ Recommended Non-suitable for Wilderness

▤ Non-Federal Minerals (Split Estate)
within Area Recommended for Wilderness

X—X Recommended Road Closure

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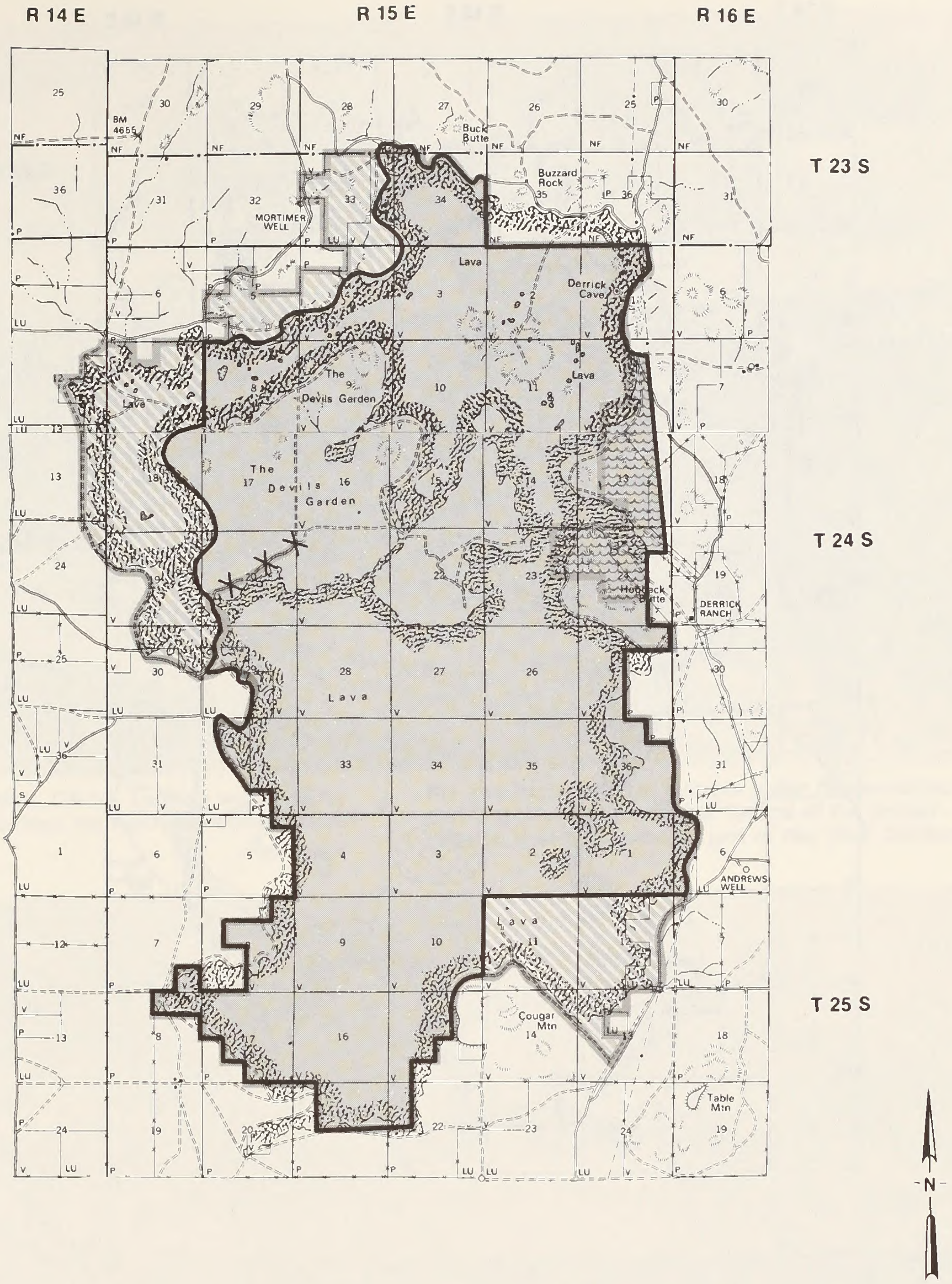
Lakeview District

Devil s Garden Lava Bed WSA
OR-1-2

ENHANCED ALTERNATIVE

MAP 3



LEGEND

▬ Wilderness Study Area Boundary

▢ Recommended Suitable for Wilderness

▨ Recommended Non-suitable for Wilderness

▤ Non-Federal Minerals (Split Estate) within Area Recommended for Wilderness

✕—✕ Recommended Road Closure

U. S. Department of the Interior
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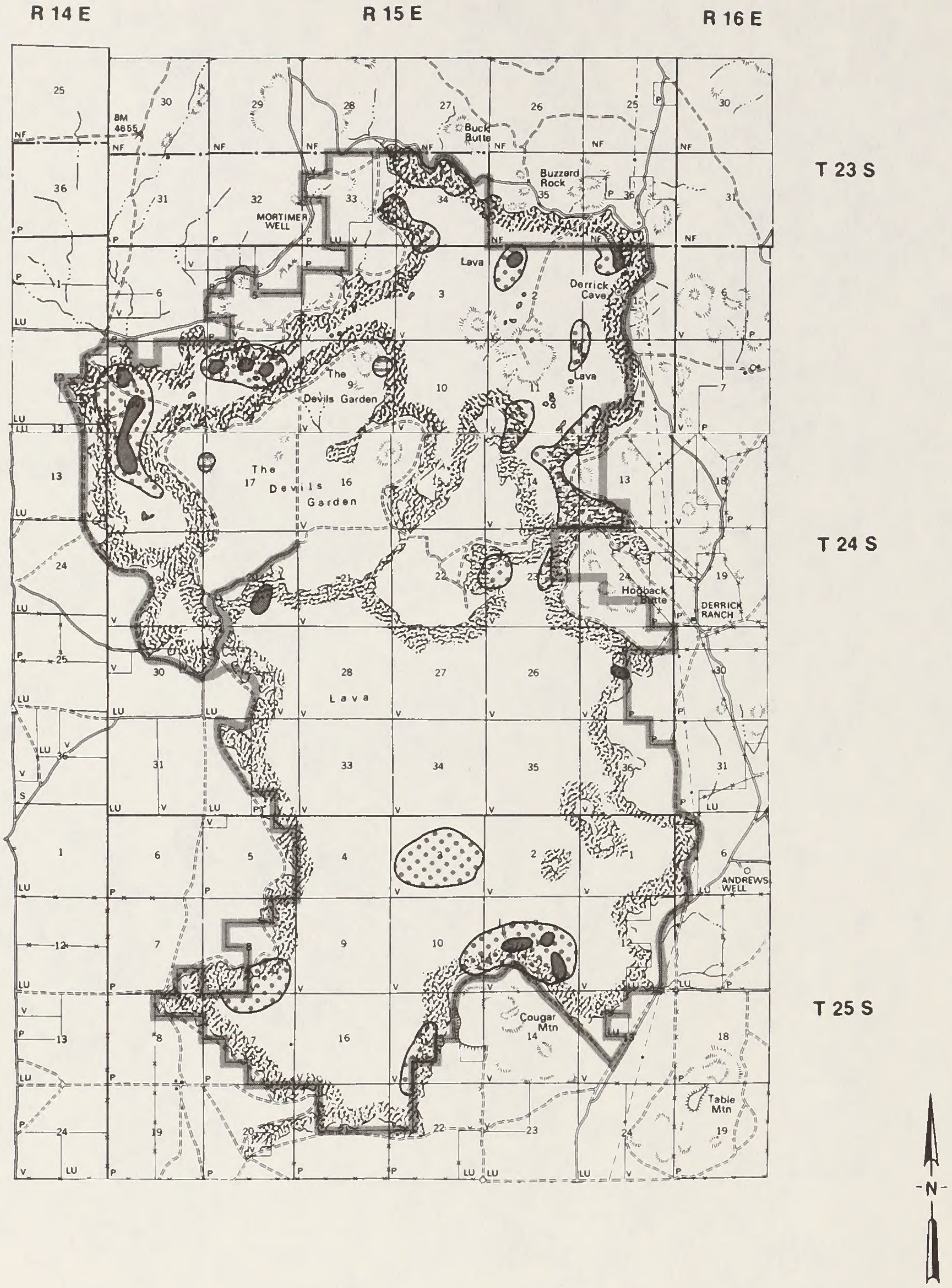
Lakeview District

Devil s Garden Lava Bed WSA
OR-1-2

PARTIAL ALTERNATIVE

1 0 1 2 MILES

MAP 4



■ **High Potential**
(4D) for Slab Lava

▒ **Medium Potential**
(3D) for Slab Lava

☰ **High Potential**
(4D) for Cinders

Entire WSA:
Medium Potential
(3B) for Geothermal Resources, Gold
Silver, Zinc and Mercury

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Devils Garden Lava Bed WSA
OR-1-2

MEDIUM OR HIGH POTENTIAL MINERAL OR ENERGY RESOURCES

1 0 1 2 MILES

MAP 5

Devils Garden Lava Bed WSA, OR-1-2. Looking west into the central portion of the WSA from the northeast corner. Within the area recommended suitable under the enhanced and partial (preferred) alternative. Typical of the juniper vegetation in the northeast part of the WSA. October 1981.

Devils Garden Lava Bed WSA, OR-1-2. Looking northwest across the southeast corner of the WSA near Cougar Mountain. Within the area recommended suitable under the enhanced and partial (preferred) alternative. Shows the open scape and pahoehoe lave flow near the WSA boundary. Typical of the landscape recommended nonsuitable under the partial (preferred) alternative near this location to allow for the development of slab lava. October 1981.

Appendix to the Wilderness Environmental Impact Statement for Oregon

Squaw Ridge Lava Bed Wilderness Study Area (OR-1-3)

General Description of Study Area

The Squaw Ridge Lava Bed wilderness study area (WSA) is approximately 80 miles southeast of Bend and 26 miles from the closest highway, State Highway 31 in Lake County (see map 1). The WSA is approximately 12 miles northeast of the town of Fort Rock.

The study area contains 27,700 acres of public land, 320 acres of private inholdings, and 320 acres of split-estate inholdings (federally managed surface, state or private subsurface mineral rights). The private and split-estate lands are at the eastern edge of the WSA all in one section. Lands surrounding the WSA are mainly public with some private lands along the western edge (see map 2).

The large, circular-shaped WSA is dominated by a dark-gray flow of basalt covering two-thirds of the area. The flow itself is a flat cone with a very irregular, broken and rugged surface. Elevation varies from a low of 4,300 feet to a high of 5,585 at Lava Mountain. Vegetation in the WSA consists primarily of western juniper/sagebrush/bunchgrass communities on the lava flow and western juniper/big sagebrush-rabbitbrush communities surrounding the flow.

Interrelationships

There are no significant interrelationships between this WSA and other WSAs, special management designations, or programs administered by other agencies.

Issues

Issues relating to each WSA were raised by BLM and the public during the wilderness inventory and EIS planning and scoping process. These issues concern both the effects of wilderness designation on existing and potential land uses or resources in the WSA, as well as the effects of existing and potential land uses or resources on wilderness values. Land uses or resources raised as issues specifically for this WSA include:

- potential slab lava sales in the area,
- livestock grazing,
- private land adjacent to the WSA (effects of wilderness designation on private lands are addressed in Statewide EIS volume), and
- protection of and access to caves.

Description of the Alternatives

The following alternatives are analyzed:

- all wilderness,
- partial (preferred alternative)
- no wilderness/no action

An enhanced wilderness alternative was not analyzed because it would not differ substantially from the all wilderness alternative. An enhanced alternative would not increase manageability nor would any substantial conflicts or problems be resolved by an alternative which acquired inholdings.

All Wilderness

The all wilderness alternative would recommend all 27,700 acres of public land in the WSA suitable as wilderness (see map 2). For purposes of analysis, it is assumed the 320 acres of private and 320 acres of split-estate inholdings would not be acquired. The private lands and mineral rights on the split estate could be acquired through purchase or exchange with willing owners.

Partial (Preferred Alternative)

The partial alternative would recommend 20,890 acres suitable as wilderness. It would recommend 6,810 acres of land outside the lava flow as nonsuitable. The boundaries of the suitable area under this alternative would follow the physical edge of the lava flow on the south and the trail immediately adjacent to the flow around the rest of the WSA (see map 3). This alternative would eliminate from the area recommended suitable all man-made features, except a seeded area in the southeast corner, and all private and split-estate inholdings.

No Wilderness/No Action

The no wilderness/no action alternative would recommend the entire WSA nonsuitable as wilderness. It represents the situation most likely to occur without wilderness designation. The area would be managed according to the current land use plan, which includes the following features relevant to this analysis:

- implementation of proposed wildlife projects including vegetative manipulation (burning and seeding) and structural projects, and
- continued availability for slab lava and cinder removal as well as other mineral exploration and development.

Table 1 summarizes the proposed management of the WSA under each alternative.

Table 2 summarizes the environmental consequences of each alternative.

Table 1. Summary of Proposed Management Under Each Alternative, Squaw Ridge Lava Bed WSA (OR-1-3)

Proposed Management	All Wilderness	Partial	No Wilderness/ No Action
Acres Designated as Wilderness	27,700	20,890	0
Acres Closed to ORVs by Wilderness Designation	27,700	20,890	0
Miles of Ways Closed	15	2	0
Acres Withdrawn from Mineral Location and Leasing by Wilderness Designation	27,700	20,890	0
Structural Wildlife Projects Developed: Catchments & Guzzlers (number)	0-4	4	4
Vegetative Manipulation for Wildlife: Brush Control with Seeding (acres)	0	500	500

Manageability of the Area as Wilderness

The areas recommended suitable under the all wilderness and the partial (preferred) alternatives would be easily managed as wilderness.

Rationale for Selection of the Preferred Alternative

The partial alternative is preferred because it would preserve the portion of the WSA with the most wilderness values. The benefits of preserving wilderness values in areas recommended as suitable would outweigh the benefits of keeping those areas open to uses which would conflict with wilderness preservation, such as energy and mineral development.

The partial alternative is preferred over the all wilderness alternative because it would allow wildlife projects in the northeastern portions of the WSA which are recommended as nonsuitable. This alternative would also allow for better fire management in protecting surrounding lands.

Affected Environment

This section discusses only those activities or resources that influence the character of the study area, or that may be affected by the alternatives.

Wilderness Values

Naturalness

A majority of the WSA is in a pristine condition. The

Table 2. Summary of Environmental Consequences of Alternatives, Squaw Ridge Lava Bed WSA (OR-1-3)

Resource or Activity	All Wilderness	Partial (Preferred Alternative)	No Wilderness/No Action
Wilderness Values	Would add 27,700 acres to the NWPS. Excellent geological features, high quality and diverse vegetation, and outstanding opportunities for solitude and primitive recreation would be preserved. Closure of 15 miles of ways would enhance wilderness values. The area would be manageable as wilderness.	Would add 20,890 acres to NWPS. 6,810 acres recommended as nonsuitable. Landform and vegetative communities preserved would be less diverse, and fewer opportunities for solitude and primitive recreation preserved than in all wilderness alternative. Only man-made feature in wilderness would be a grass seeding. Geological features and other wilderness values in lava flow would be protected from mining activities. Closure of 2 miles of ways would enhance wilderness values. The area would be manageable as wilderness.	Wilderness values could be adversely affected outside the lava flow from wildlife and possible range projects. Damage to geological features, vegetation, naturalness and other wilderness qualities could result from slab lava and cinder removal inside the flow.
Energy and Mineral Development	Development precluded on 27,700 acres, including 27,700 acres with moderate potential for geothermal, 1,740 acres with high and moderate potential for slab lava (which is much in demand from this area), and 400 acres with high potential for cinders.	Development precluded on 20,890 acres, including 20,890 acres with moderate potential for geothermal, 1,740 acres with high and moderate potential for slab lava, and 400 acres with high potential for cinders.	No impact.
Vegetation	Vegetation preserved.	Vegetation preserved in suitable area. Diversity in the WSA would be reduced by proposed burn-and-seed project on 500 acres.	Vegetation diversity in the WSA would be reduced by proposed burn-and-seed projects on 500 acres.
Wildlife	Wildlife habitat preserved. Proposed seeding projects would be foregone and guzzlers may be foregone, with possible loss of some deer in stress years.	Wildlife habitat preserved in suitable area. Proposed seeding and guzzlers projects would be outside portion recommended suitable. Deer would benefit.	Proposed projects would be developed, benefiting deer.
Livestock Grazing	Minor inconvenience to livestock users involving motorized vehicles. No change in existing situation. Potential livestock developments (rancher-funded) could not be realized.	Some potential rancher-funded projects could be developed on portions of the lava-free lands. Possible benefits to livestock from wildlife projects.	Some potential rancher-funded projects could be developed. Possible benefits to livestock from wildlife projects.
Recreation Use	Enhanced primitive recreation values on lava-free peripheral lands by precluding vehicles. Minimal loss of vehicle access for recreationists on lava-free areas. Net increase in overall recreation use.	Diversity of primitive recreation activities reduced. Many of the best camping areas (lava-free areas) would be outside the suitable area. Vehicle-related recreation not affected. Cave would be vulnerable to continued vandalism by people using off-road vehicles. Net increase in overall recreation use.	Primitive recreation values will be reduced from wildlife and possible livestock projects and slab and cinder removal. Cave would be vulnerable to continued vandalism by people using off-road vehicles. Negligible change in overall recreation use.
Economic Value and Local Income	Decrease in annual economic value could range from $1,219 to $135, depending on what proposed projects would be allowed in wilderness. Local personal income would not change. Excludes unknown economic effects of mineral development and unquantified changes in recreation use.	Decrease in annual economic value of $1,954. Local personal income would not change. Excludes unknown economic effects of mineral development and unquantified changes in recreation use.	Decrease in economic value by $1,819 and no change in local personal income.

rugged surface of the lava flow has precluded almost all types of developments, except for very minimal fire suppression with hand tools. Fire plays a major role in the ecology of the vegetation on the lava flow which is quite prone to wildfires. Burned areas can be observed throughout the WSA.

The man-made features in the WSA are minimal and are scattered throughout the lands not covered by lava. They include five small reservoirs and waterholes, 7½ miles of pasture fences, a 425-acre seeding (13 years old), and 15 miles of vehicle ways (vehicle routes established and maintained solely by the passage of vehicles). Less than 1 percent of the WSA is influenced by the works of man. (The area of influence is an estimate of the acreage within the WSA from which these man-made features can be seen.) Sagebrushes, rabbitbrushes, and native bunchgrasses have reinvaded portions of the seeding. The heavy cover of juniper and shrubs and the scattered low hills make the developments unnoticeable in the area as a whole.

Opportunities for Solitude or Primitive and Unconfined Types of Recreation

The opportunities for solitude are outstanding in the WSA. The very irregular surface of the lava flow and the abundant juniper, mountain mahogany, and shrub cover help to isolate the visitor. One can have a feeling of total solitude just a short distance into the lava flow. Some areas along the northeastern and southeastern edge of the WSA would offer less opportunity for solitude due to the lower stature of the vegetation and flat terrain. These areas still afford excellent solitude potential.

Opportunities for primitive and unconfined types of recreation are outstanding. Day hiking, backpacking, camping, sightseeing, photography, caving, and exploring opportunities are all excellent. The WSA offers the visitor outstanding views, abundant wildlife, a variety of geological features, and a wide array of plants. Hiking is very challenging, though often slow and tiring on the lava because of its irregular and very rough surface. The area surrounding the lava offers the best terrain for camping and offers easier country for recreationists unable to cross the rugged lava areas.

Special Features

The WSA is known for its excellent geological features. This recent lava flow contains both aa (blocky) and pahoehoe (ropy) type lava. Lava features which can be observed on the flow include: collapses, tumuli (fractured basaltic domes), cinder cones, squeeze-ups (lava forced through fissures), spires, and ropy lavas. Numerous geology students and classes visit the lava flow annually to study its geological features.

Another special feature is the native vegetation in the WSA. The cinder cones are covered almost exclusively with bluebunch wheatgrass, a native bunchgrass. This type of plant community (almost exclusively bluebunch wheatgrass) is uncommon in southeastern Oregon. The rest of the flow is covered with a wide array of native bunchgrasses, wildflowers, colorful lichens, and numerous shrubs and trees including juniper, mountain mahogany, and some ponderosa pine and quaking aspen.

The area contains numerous kipukas — areas of relatively undisturbed vegetation in lava fields. The WSA is in an ecotone between the sagebrush steppe and ponderosa pine forest and thus contains an assemblage of plants found in both ecosystems. The high quality of the native vegetation is exemplified by the diversity of species and the abundance of plants on the flow surface. Desert-sweet, an uncommon shrub, is endemic to lava flows such as this.

The Squaw Ridge Lava Bed WSA is crucial deer winter range for the Devils Garden deer herd. Thousands of mule deer occupy the WSA in the winter months. The northern bald eagle, federally listed as threatened in Oregon, winters in the area and relies heavily on deer carrion for its survival. Two felines, the cougar and the bobcat, also occupy the WSA during some parts of the year.

Diversity in the National Wilderness Preservation System (NWPS)

According to the Bailey-Küchler system of classifying ecosystems, the Squaw Ridge Lava Bed WSA is located in the Intermountain Sagebrush Province, with a potential natural vegetation of sagebrush steppe with juniper. The WSA is located in a transition zone between the ponderosa pine forest to the north and the sagebrush steppe to the south.

Vegetative communities listed in the High Lava Plains section of the Oregon Natural Heritage Plan and occurring in the WSA include western juniper/Idaho fescue, big sagebrush/Idaho fescue, mountain mahogany, and Idaho fescue- bluebunch wheatgrass. Other vegetative communities not listed in the Oregon Natural Heritage Plan but which grow in the WSA include western juniper/big sagebrush/Idaho fescue and bluebunch wheatgrass.

The Squaw Ridge Lava Bed WSA is located within 5 hours' driving time of several standard metropolitan statistical areas with populations over 100,000: Eugene/Springfield, Salem, Portland, and Medford Oregon.

Energy and Mineral Development

Energy and mineral resources were evaluated by the BLM using available geologic data, results of a BLM geologic/geochemical study, and data in a report prepared by the Engineer's International, Incorporated, a consulting firm under contract with BLM. The report is titled "Geological Investigation and Mineral Inventory of Devils Garden, Four Craters, and Squaw Ridge Lava Bed in Lake County, Oregon."

The WSA has been classified according to a rating system that indicates both the potential for occurrence (geologic favorability) of certain minerals, as well as the quantity and quality of data on which the rating is based (confidence level). A description of the rating system is provided in the Statewide EIS volume.

Geothermal is the main potential energy resource in the area. Although no specific areas of geothermal potential have been identified in the WSA, the entire WSA is considered moderately favorable for geothermal resources, based upon the recent volcanism and above-normal heat flow (characteristic of most of southeastern Oregon).

Part of the WSA is rated highly favorable for the occurrence of slab lava, and part is moderately favorable. Part of the WSA is also highly favorable for the occurrence of cinders. Slab lava occurring near the margins of the Squaw Ridge lava flow is considered exploitable, while interior deposits of slab lava, and the cinder deposits, are not readily accessible.

In the past, slab lava has been sold and taken illegally from the Devils Garden flow. Numerous inquiries to the Lakeview District about purchasing slab lava attest to the demand for this decorative stone. Except for the Devils Garden, Squaw Ridge and, to a lesser extent, the Four Craters areas, (all wilderness study areas), stone of this quality does not appear to be available in the area for hundreds of miles.

Table 3 gives the mineral potential classifications for the WSA. Map 4 shows portions of the WSA rated high and moderate (medium) for slab lava and high for cinders.

The main mineral deposits within the WSA consist of slab lava (decorative stone) and cinders.

Table 3. Classification of Energy and Mineral Potential, Squaw Ridge Lava Bed WSA (OR-1-3)

Commodity	Area	Classification Level	Confidence Level
Metals (mercury, gold, silver)	Entire WSA	2	B
Geothermal	Entire WSA	3	B
Uranium/Thorium	Entire WSA	1	A
Coal	Entire WSA	2	B
Oil/Gas	Entire WSA	2	A
Limestone	Entire WSA	1	C
Bentonite	Entire WSA	1	B
Diatomite	Entire WSA	2	B
Zeolites	Entire WSA	1	B
Slab lava	See map 4	4	D
	See map 4	3	D
	Rest of WSA	2	C
Cinders	See map 4	4	D
	Rest of WSA	1	C

Legend:
Class 1 - Lack of indications of favorability
Class 2 - Low favorability
Class 3 - Moderate favorability
Class 4 - High favorability

Confidence Level A - Insufficient data or no direct evidence
Confidence Level B - Indirect evidence available
Confidence Level C - Direct evidence but quantitatively minimal
Confidence Level D - Abundant direct and indirect evidence

There were no mining claims and no oil and gas or geothermal leases in the WSA as of January 1, 1984.

The majority of the WSA is characterized by a Quaternary basalt flow with interior, northwest trending cinder cones. The surface rocks of the outer portions of the WSA are composed of Quaternary to Tertiary vesicular basalt. The subsurface geology is largely unknown, but pre-Tertiary marine sedimentary rocks may exist at depth.

Vegetation

The vegetative communities in the WSA consist mainly of western juniper/big sagebrush/bunchgrass communities. A majority of the WSA is covered with a large expanse of lava. Vegetation in the WSA varies from early seral, where recent fires have occurred, to climax vegetation on portions of the lava flow. (Seral refers to a stage of ecological condition based on the difference between the present plant community and climax vegetation, the relatively stable, final stage in plant succession.) Climax vegetation surrounding the flow would be western juniper/big sagebrush/Idaho fescue.

Junipers are the dominant tree species on the lava flow with mountain mahogany secondary. Isolated pines and quaking aspen occur along the north end of the lava flow. Shrubs consist mainly of big sagebrush, bitterbrush, wax currant, desert-sweet, rabbitbrushes, and ocean-spray. The native bunchgrasses are abundant with bluebunch wheatgrass forming pure stands on the cinder cones in the WSA. Thurber's needlegrass, bottlebrush squirreltail, bluegrasses, Junegrass, and Indian ricegrass are other common native grasses.

The lava-associated vegetation has had no livestock use or influence from humans except for minimal fire suppression with hand tools. The lava-free peripheral lands are comprised of sagebrush, rabbitbrush, and bunchgrass openings surrounded by stringers of juniper and Idaho fescue.

Wildlife

The Squaw Ridge Lava Bed WSA is totally within crucial winter range for the Devils Garden deer herd. Between one quarter and one third of this herd of about 10,000 deer use the Squaw Ridge Lava Bed WSA for all or part of their winter habitat. This area is crucial for both the thermal cover the lava fields and juniper provide, as well as for its forage production. Wintering deer suffer from disturbance by recreationists using vehicles for access to the area. Bald eagles, cougar and bobcat occupy the area part of the year.

The only existing habitat development in the WSA for wildlife is the crested wheatgrass seeding at the southeast corner of the WSA to benefit deer.

Approximately 500 acres spread over six sites along the north and east edge of the lava flow are proposed in BLM's Fort Rock-Silver Lake Habitat Management Plan (HMP) for prescription burning and seeding with crested wheatgrass and legumes. Four big game guzzlers (wildlife watering devices) are also proposed near or in the seedings, but they are not dependent on the seedings.

The projects are not intended to increase the number of deer in the area. During the planning process, Oregon Department of Fish and Wildlife and BLM agreed that the maintaining current numbers would be the management goal. These projects would, however, be intended to improve the nutritional state of the herd through increased forage diversity and quality.

Livestock Grazing

Portions of five allotments are within the Squaw Ridge Lava Bed WSA. Table 4 shows existing livestock use in AUMs (animal unit months, the amount of forage needed to sustain one cow and calf, or equivalent animals, for one month).

Table 4. Existing Livestock Use, Squaw Ridge Lava Bed WSA (OR-1-3)

Grazing Allotment	Licensed AUMs in Allot.	Period of Use	Percent of Allot. in WSA	Current Actual Use in WSA (AUMs)
Hogback Butte (No. 0910)	680	04/15-12/15	15.51	170
Squaw Butte (No. 0915)	1,000	05/01-09/15	50.40	437
Viewpoint (No. 0103)	29,169	03/01-11/30	0.57	253
East Green Mtn. (No. 0101)	980	04/21-1/30	10.21	197
West Green Mtn. (No. 0914)	1,233	04/26-11/25	4.89	118
Total	33,062			1,175

Existing range developments (among the man-made features listed in the Naturalness section)include five reservoirs and waterholes and 7½ miles of fence.

There are no livestock projects currently proposed in the WSA. Grazing operators have indicated a desire to contribute toward additional livestock improvements such as burn-and-seed treatments to increase livestock forage. Livestock would also benefit from the proposed wildlife projects, if they are developed (see preceding wildlife section).

Some vandalism to livestock projects and shooting of livestock has occurred in the area.

Grazing operators use the vehicle ways for salting and checking livestock. Livestock are usually gathered by horseback.

Recreation Use

Recreation use is related mostly to sightseeing, photography, hiking, rockhounding, cave exploration, and hunting. Most of the vehicle-oriented recreation is hunting, and this occurs mostly in a small area on the margins between the lava flows and the boundary roads. The remainder of the WSA is inaccessible to vehicles.

The margin areas and the islands on the east side of the WSA offer the best camping; the interior of the flows is so rugged that good camping areas are somewhat limited. The margin areas also offer primitive recreation opportunities to those who may not be able to traverse the extremely rugged interior.

Economic Value and Local Income

Livestock grazing and recreation are the only resource outputs which generate economic activity in this WSA. The WSA currently produces 1,175 animal unit months (AUMs) of livestock forage and an unknown amount of recreation activity annually. As of January 1, 1984 there were no oil and gas leases or geothermal leases on the WSA.

The economic value of existing outputs amounts to $8,860 annually, and local personal income generated by existing outputs amounts to $12,067 annually. The terms economic value and local personal income are discussed in the Statewide EIS volume.

Environmental Consequences

This section discusses the environmental consequences of implementing each of the alternatives. Resources and activities not significantly affected by any of the alternatives are not discussed. General impact conclusions applicable to all WSAs, including impact conclusions based on speculative future developments (developments which are possible, but are not currently proposed), are discussed in the Statewide EIS volume. That volume also discusses certain assumptions that were made for this analysis.

Effects on Wilderness Values

The **all wilderness alternative** would add 27,700 acres to the National Wilderness Preservation System (NWPS). Designation would preserve the variety of geologic features in the lava flow, vegetative communities comprised almost totally of bluebunch wheatgrass (uncommon in southeastern Oregon), crucial deer winter range, and bald eagle habitat. Closure of 15 miles of ways would enhance wilderness values.

The **partial alternative** would add 20,890 acres to the NWPS. This alternative would eliminate from the area designated wilderness all man-made features, except for the seeding in the southeast corner. The lava flow area, with its geological features and pristine vegetation, and a very small percent of the lands not covered by lava, mainly in the eastern portion, would be preserved. Closure of 2 miles of ways would enhance wilderness values.

Wilderness quality on portions of the nonsuitable area would be adversely affected by proposed vegetative manipulation and structural developments for wildlife and possible rancher-funded livestock burn-and-seed treatments on the lava-free lands. The wilderness would be less diverse than in the all wilderness alternative because the lava-free lands and the juniper-sagebrush-bunchgrass communities would not be included in the suitable area. The nonsuitable portion contains the majority of the best camping sites and the easier hiking terrain.

Under the **no wilderness/no action alternative,** primitive recreation opportunities and the area's naturalness could be lost in portions of the area outside the lava flow because of wildlife and possible rancher-funded livestock projects. Slab lava and cinder removal, as well as other energy and mineral development could also alter parts of the flow, degrading or destroying some of the geological features for which the area is most noted and visited.

Effects on Energy and Mineral Development

Areas designated wilderness would be withdrawn from mineral exploration and development: 27,700 acres under the **all wilderness alternative,** and 20,890 acres under the **partial alternative.**

These withdrawals would include the area rated moderate for geothermal resources, which encompasses the entire WSA. Withdrawals under both the all wilderness and partial alternative would include the 220-acre portion rated high for slab lava, the 1,520-acre portion rated moderate for slab lava, and the 400-acre portion rated high for cinders.

No acreage would be withdrawn under the **no wilderness/no action alternative.**

Effects on Vegetation

Areas designated wilderness would not be subject to most surface disturbing activities. Vegetation dependent upon the existing undeveloped environment would thus be maintained.

Under the **partial** and **no wilderness/no action** alternatives, the vegetative manipulation (burn-and-seed) project on the lava-free peripheral land would reduce vegetation diversity on 500 acres in the WSA by eliminating shrubs and forbs and converting vegetation to crested wheatgrass.

Effects on Wildlife

Wildlife habitat would be preserved in areas designated wilderness.

Burning and seeding of six sites totaling 500 acres would be precluded under the **all wilderness alternative.** Four proposed guzzlers might or might not be allowed, depending on a site-specific assessment of whether they would conform with the Wilderness Management Policy. Precluding these projects would not have any significant effect on deer numbers in the herd management unit, although it could result in the loss of some deer in severe stress years.

The **partial alternative** would allow the burn-and-seed projects and the guzzlers. The deer could also benefit from livestock projects if any are developed by livestock operators. Populations of wintering deer would continue to be adversely affected by vehicle disturbance (poaching, harassment) in portions of the lava-free areas.

Under the **no wilderness/no action alternative,** proposed wildlife projects would be allowed. Deer could also benefit from livestock projects, if any are developed.

Effects on Livestock Grazing

Under the **all wilderness alternative,** existing problems of vandalism to livestock projects and shooting of livestock could be reduced due to elimination of recreation vehicles and associated activities. Access by vehicles for the management of livestock could possibly be eliminated or restricted. Range improvements presently in the WSA would be maintained. There are no BLM-funded projects planned. Some grazing operators have expressed a desire to contribute funds to increase forage production through burn-and-seed treatments, if authorized by the BLM. These types of projects would not be allowed in this alternative. Benefits to livestock from proposed wildlife projects would not be realized.

The **partial alternative** would allow for some rancher-funded projects in the nonsuitable portion, if approved by BLM. Livestock would benefit from proposed wildlife projects. Possible rancher-funded projects would not be allowed in a small portion of the lava-free lands recommended suitable.

Under the **no wilderness/no action alternative,** possible rancher-funded range improvements would be allowed. Livestock would also benefit from proposed wildlife projects.

Effects on Recreation Use

Under the **all wilderness alternative,** elimination of vehicle access would enhance opportunities for primitive recreation in the lava-free area. Vehicle-oriented recreation would not be significantly affected in the WSA, because the lava flow makes a majority of the area inaccessible to vehicles. The distance from the boundary road to the main lava flow is generally less than one mile, which is easily walked by most recreationists and hunters. This alternative probably would result in at least some net increase in overall use of the area. The WSA has the capacity to allow large numbers of users within the area before contacts between users would adversely affect the potential for primitive recreation.

The **partial alternative** would eliminate most of the lava-free lands from wilderness. Eliminating these peripheral lands would reduce recreation diversity within the WSA. Camping opportunities in some portions of the WSA (south, north, west) would be mainly outside the wilderness area where some proposed wildlife and livestock projects may also be implemented. Vehicle- oriented recreation would not be affected by this alternative. The cave located in the south end of the WSA on the lava-free land is located in the nonsuitable portion. The cave would continue to be vulnerable to vandalism because of vehicle access.

Under the partial alternative, there would be a net increase in overall recreation use in the WSA.

The **no wilderness/no action alternative** would allow proposed projects to adversely affect the quality of the primitive recreation opportunities in the WSA, especially on the lava-free lands. Vehicle-related recreation use would be unaffected, and overall recreation use is expected to change little if at all. The cave in the south end of the WSA would continue to be vulnerable to vandalism.

Effects on Economic Value and Local Income

The economic effects for the alternatives are presented in tables 5 and 6. Table 5 shows the effects on economic value and table 6, the effects on local personal income. It is not known at this time whether individual proposed structural developments, such as the guzzlers proposed for

Table 5. Effects of Alternatives on Annual Economic Value, Squaw Ridge WSA (OR-1-3) (1981 price levels)

Item	Unit of Measure	All Wilderness	Partial	No Wilderness/ No Action
VALUE OF PLANNED INVESTMENTS[1]				
Investments[2]	$	-1,084 to 0	-1,819	-1,819
Net change due to investment[3]		-1,084 to 0	-1,819	-1,819
VALUE OF OTHER EXPECTED CHANGES IN OUTPUTS				
Reduced access[4]	$	-135	-135	0
Total	$	-135	-135	0
VALUE OF TOTAL EXPECTED CHANGES IN OUTPUTS				
All categories	$	-1,219 to -135	-1,954	-1,819

[1] A vegetative manipulation project involving $9,125 total expenditures, and structural projects involving $12,000. Amounts shown in the table represent combined results of both types of projects, including construction and maintenance.

[2] Average annual cost of investment expenditures for vegetative manipulation and structural projects for wildlife, amortized at 7.875% over 50-year period.

[3] For alternatives reflecting a range of negative net values (i.e., investment costs exceeding benefits), the figures are reversed to show the larger negative value as the lower end of the range (e.g., -20 to 0) so that the summation of effects for all categories in each column will show the full range of potential.

[4] Additional cost (shown as negative value) due to restriction of vehicular access for livestock operator.

Table 6. Effects of Alternatives on Local Personal Income, Squaw Ridge WSA (OR-1-3) (1981 price levels)

Item	Unit of Measure	All Wilderness	Partial	No Wilderness/ No Action
INCOME FROM PROPOSED INVESTMENTS[1]				
Construction activity[2]	$	0 to +1,484	+2,612	+2,612
Net change due to investment	$	0	0	0

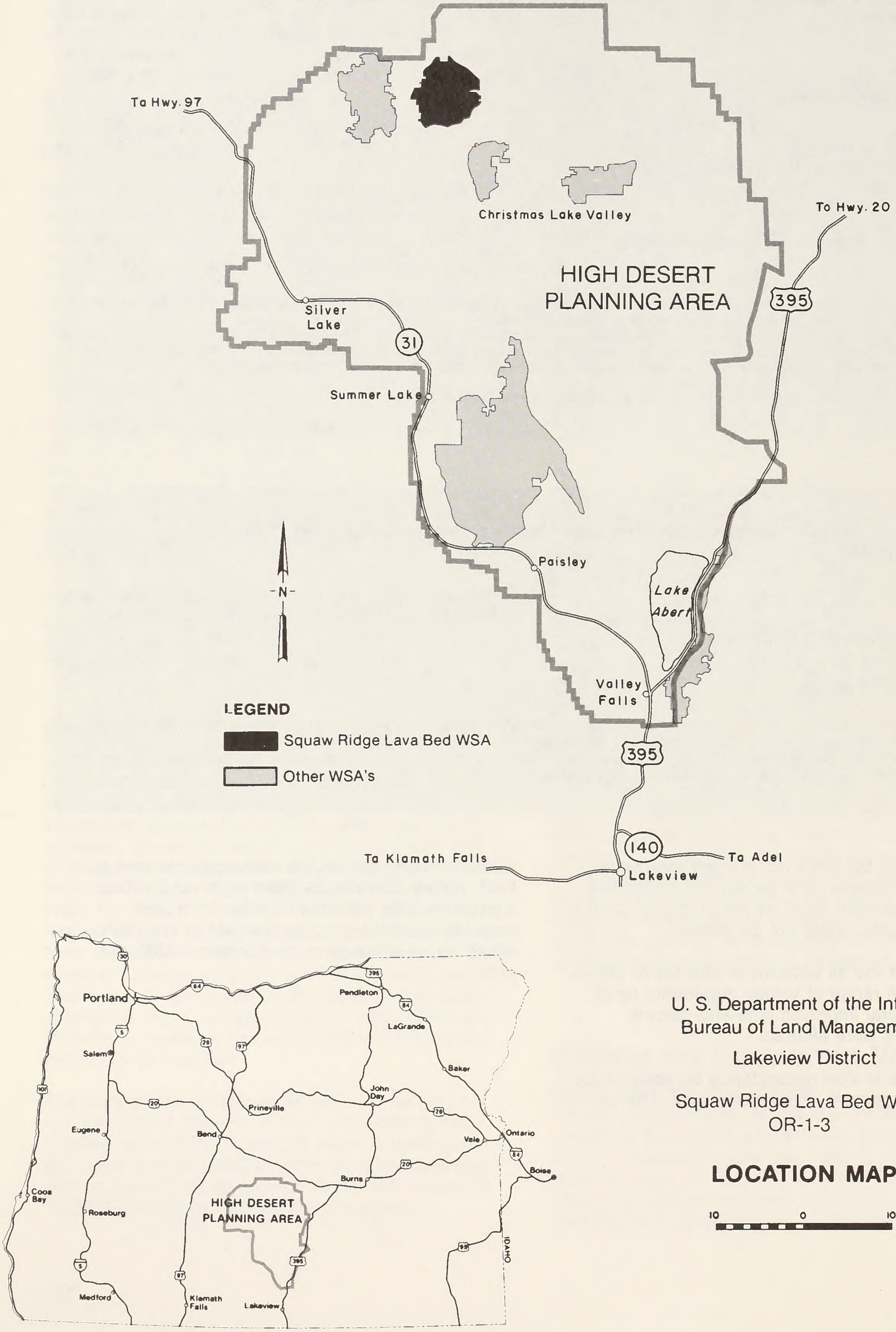
[1] A vegetative manipulation project involving $9,125 total expenditures, and structural projects involving $12,000. Amounts shown in the table represent combined results of both types of projects, including construction and maintenance.

[2] Local personal income generated annually during assumed 5-year construction period. This amount cannot be added to the income resulting from grazing and hunting activity because it is not sustained over the analysis period.

this WSA, would be constructed if the area were designated wilderness. It is known that vegetative manipulation projects, such as the proposed burn to control sagebrush, would not be allowed.

The column for the all wilderness alternative shows the effects as a range of values dependent upon whether structural improvements and grazing operator access were allowed.

Currently, there is little dependence on vehicles for livestock management in the study area. The all wilderness and partial alternatives would restrict such vehicle use unless there were no practical alternative. The maximum impact from road closures upon the grazing operator in the WSA would be an increase in cost of about $135 per year.



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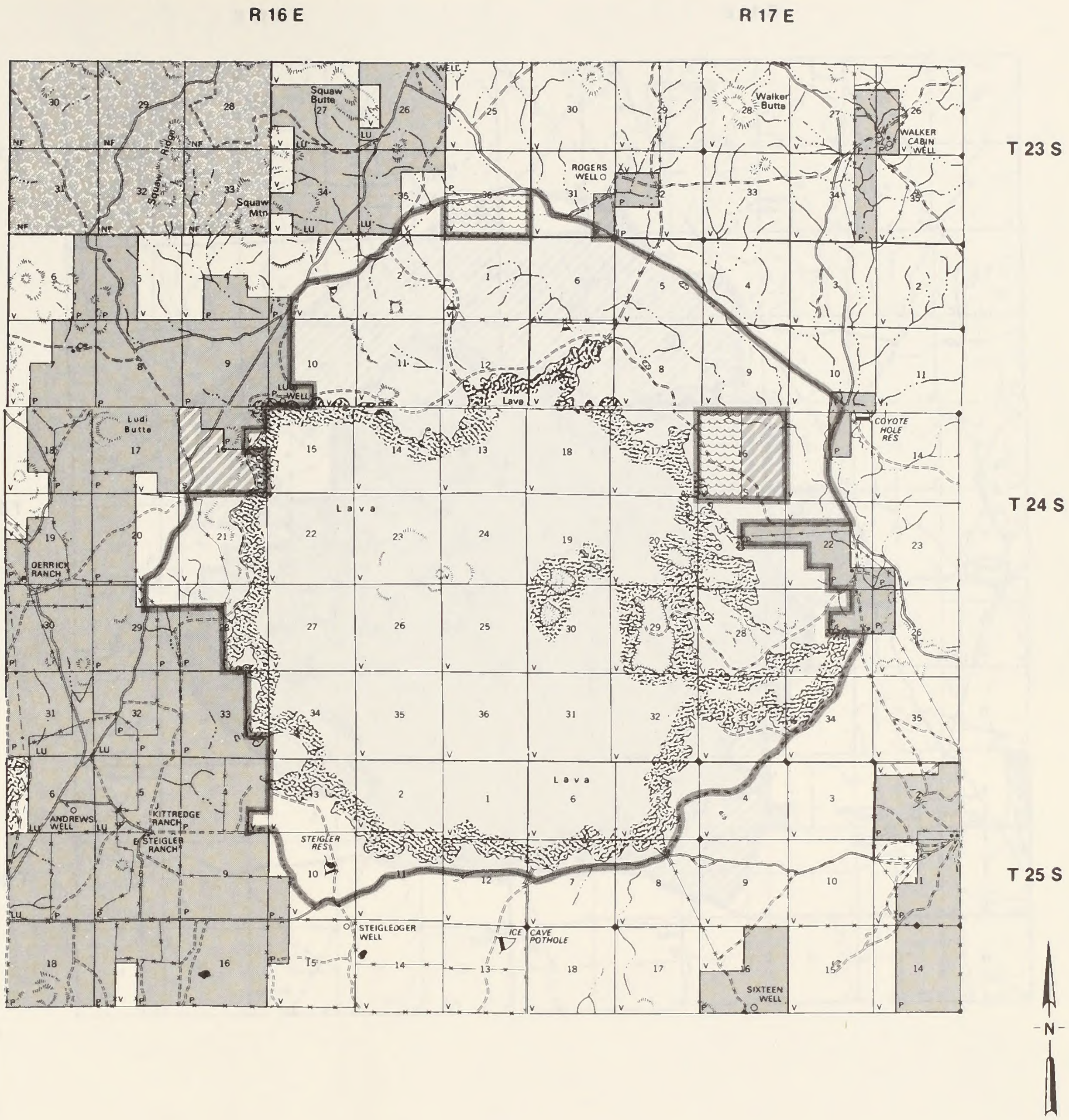
Bureau of Land Management
Lakeview District
Squaw Ridge Lava Bed WSA
OR-1-3

LOCATION MAP

MAP 1



LEGEND

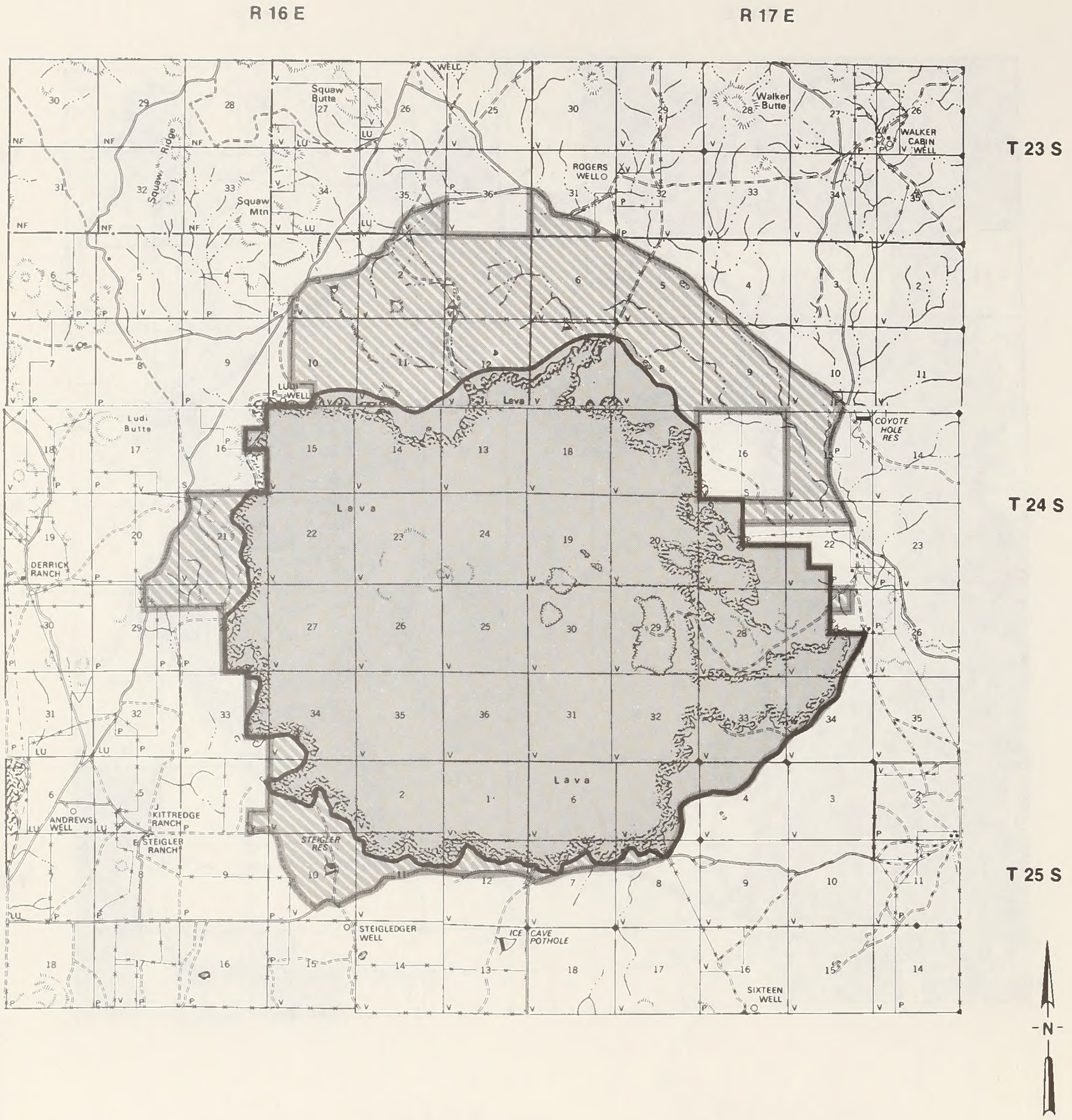
- ━ Wilderness Study Area Boundary
- ☐ Bureau of Land Management
- ▨ State
- ■ Private
- ▩ U.S. Forest Service
- ▤ BLM Surface-State or Private Subsurface (Split Estate)
- ▦ Edge of Lava

U. S. Department of the Interior
Bureau of Land Management
Lakeview District

Squaw Ridge Lava Bed WSA
OR-1-3

LAND OWNERSHIP

MAP 2



LEGEND

— Wilderness Study Area Boundary

■ Recommended Suitable for Wilderness

▨ Recommended Non-suitable for Wilderness

U. S. Department of the Interior
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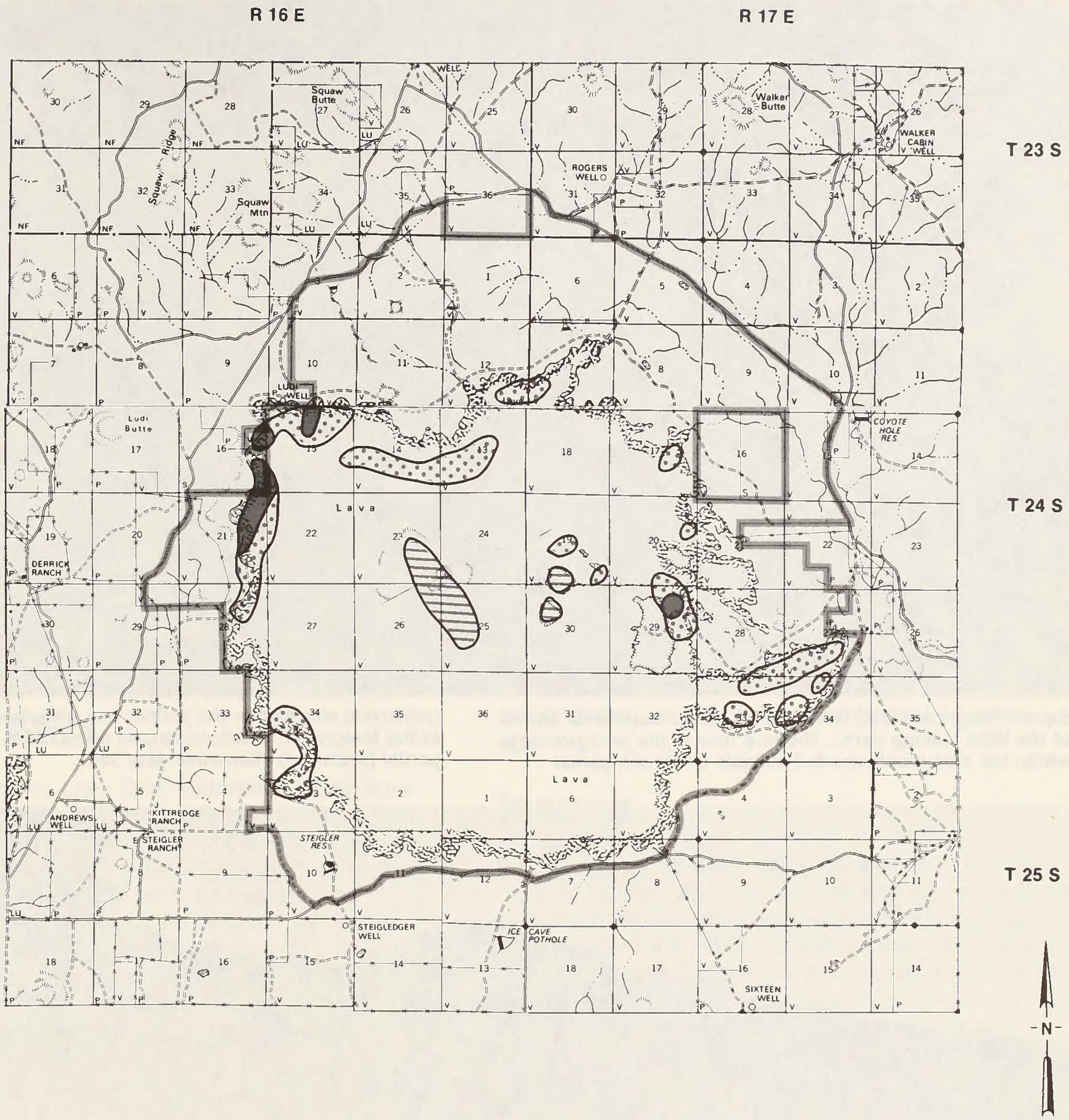
Lakeview District

Squaw Ridge Lava Bed WSA
OR-1-3

PARTIAL ALTERNATIVE

1 0 1 2 MILES

MAP 3



■ **High Potential (4D) for Slab Lava**

░ **Medium Potential (3D) for Slab Lava**

▤ **High Potential (4D) for Cinders**

Entire WSA:
Medium Potential
(3B) for Geothermal Resources

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Lakeview District

Squaw Ridge Lava Bed WSA
OR-1-3

MEDIUM OR HIGH POTENTIAL MINERAL OR ENERGY RESOURCES

1 0 1 2 MILES

MAP 4

Squaw Ridge Lava Bed WSA, OR-1-3. In the southwest corner of the WSA looking north. The lava flow in the background is within the area recommended suitable under the partial (preferred) alternative; the juniper and grassland community in the foreground is recommended nonsuitable under the partial (preferred) alternative. May 1982.

Squaw Ridge Lava Bed WSA, OR-1-3. In the east-central portion of the WSA looking southwest from a cinder cone across a lava flow. Within area recommended suitable under the partial (preferred) alternative. Typical of the terrain in the core of the WSA. May 1982.

Appendix to the Wilderness Environmental Impact Statement for Oregon

Four Craters Lava Bed Wilderness Study Area (OR-1-22)

General Description of Study Area

The Four Craters Lava Bed wilderness study area (WSA) is approximately 60 miles southeast of Bend, Oregon and eight miles north of the small town of Christmas Valley in Lake County (see map 1). Located about 25 miles east of Oregon State Highway 31, the WSA can be reached by county roads to Christmas Valley and then a dirt, BLM road north.

Roughly oval shaped, the study area contains 11,960 acres, all of it public land (see map 2). A dead-end road extends approximately 1.7 miles into the WSA, forming part of the northern boundary. The lands adjacent to the WSA are public except for private land and a section of split-estate (federally managed surface, state or private subsurface mineral rights) on the east side of the area. The rest of the boundary is along roads.

About half of the acreage in the WSA contains rugged lava flows and cinder cones. The remaining acreage is sagebrush/juniper and sagebrush/grassland flats. The WSA contains the "Crack in the Ground," a distinct geologic feature in the form of a large tension crack some two miles long and from 10 to 70 feet in depth. The crack reaches a maximum width of about 20 feet.

Interrelationships

There are no significant interrelationships between this WSA and other WSAs, other special land use designations, or programs administered by other agencies.

Issues

Issues relating to each WSA were raised by BLM and the public during the wilderness inventory and EIS planning and scoping process. These issues concern both the effects of wilderness designation on existing and potential land uses or resources in the WSA, as well as the effects of existing and potential land uses or resources on wilderness values. Land uses or resources raised as issues specifically for this WSA include:

- the WSA's very high wilderness values,
- habitat for raptor nesting,
- crucial deer winter range,
- mineral removal,
- access to the Crack in the Ground facility,
- livestock grazing , particularly altering grazing practices to protect wild lands (see Statewide EIS volume),
- cost effectiveness of water hauling for livestock in the area (addressing the cost effectiveness of private practices is beyond the scope of the EIS), and
- the need to retain grasslands as well as lava flow in the WSA for ecological diversity.

Description of the Alternatives

The following alternatives are analyzed:

- all wilderness
- preferred
- partial
- no wilderness/no action

An enhanced wilderness alternative is not analyzed because all practical measures to enhance wilderness values are incorporated in the preferred alternative.

All Wilderness

The all wilderness alternative would recommend all 11,960 acres of public land in the WSA suitable as wilderness (see map 2). The area would include all of the lava flows, as well as the Crack in the Ground and the sagebrush/juniper lands that surround the flow.

Preferred

The preferred alternative would recommend 8,660 acres suitable as wilderness and 3,300 acres nonsuitable (see map 3). In addition, an attempt would be made to acquire 440 acres of the section of split mineral estate on the east. This parcel could be acquired through purchase or exchange with willing owners. The boundary would follow the way (a vehicle route established and maintained solely by the passage of vehicles, or, if constructed, not intended to be maintained) through this section and north along the dead-end road to the northern boundary of the WSA. This would block public land more uniformly on the east side of the WSA.

Assuming acquisition of this parcel, total area recommended suitable under this alternative would be 9,100 acres.

The area recommended as nonsuitable for wilderness includes an area where livestock water is hauled daily during the grazing season. The south end of the WSA would also be recommended nonsuitable. The boundary would follow the east edge of the Crack in the Ground on a way south, then east along a section line and northeast on a way to the private land forming the east boundary.

Partial

Under the partial alternative, 5,090 acres would be recommended suitable as wilderness and 6,870 acres would be recommended nonsuitable (see map 4). In this alternative, the boundary would follow the physical edge of the lava flow and exclude all of the sagebrush/juniper lands that surround the flow. It would preserve the wilderness character of the rugged lands within the lava flow.

No Wilderness/No Action

The no wilderness/no action alternative would recommend the entire WSA nonsuitable as wilderness. It represents the situation most likely to occur without wilderness designation. The area would be managed according to the current land use plan, which includes the following features relevant to this analysis:

- use by Lake County of a cinder pit on the northernmost cinder cone, and
- continued availability for mineral exploration and development.

Table 1 summarizes the proposed management of the WSA under each alternative.

Table 2 summarizes the environmental consequences of each alternative.

Manageability of the Area as Wilderness

The areas recommended as suitable for wilderness

Table 1. Summary of Proposed Management Under Each Alternative, Four Craters Lava Bed WSA (OR-1-22)

Proposed Management	All Wilderness	Preferred	Partial	No Wilderness/ No Action
Acres Designated as Wilderness	11,960	8,660	5,090	0
Acres Closed to ORVs by Wilderness Designation	11,960	8,660	5,090	0
Miles of Ways Closed	7.5	2	0	0
Acres of Split Estate Acquired[1]	0	440	0	0
Acres Withdrawn from Mineral Location and Leasing by Wilderness Designation	11,960	8,660	5,090	0
Acres of Suitable Minor Forest Products Available for Harvest	0	440	1,360	1,360

[1] Upon acquisition, these additional lands would be incorporated into the wilderness area, closed to vehicle use, and withdrawn from mineral location and leasing.

Table 2. Summary of Environmental Consequences of Alternatives, Four Craters Lava Bed WSA (OR-1-22)

Resource or	All Wilderness	Preferred
Wilderness Values	Would add 11,960 acres to NWPS. Preserve lava flow, cinder cones and vegetative communities outside the lava flow. Closure of 7½ miles of ways would enhance wilderness values. Area would be manageable as wilderness, but livestock water hauling would complicate wilderness management in southeast portion of area.	Would add 9,100 acres, assuming 440 of split-estate were acquired; 3,300 acres would be recommended as nonsuitable for wilderness. Wilderness values would be protected in the lava flow and on some area outside the lava flow. Closure of 2 miles of ways would enhance wilderness values. Development of mineral or other resources in nonsuitable area could adversely affect wilderness values. Portion recommended suitable for wilderness would be manageable as wilderness.
Energy and Mineral Development	Development precluded on 11,960 acres, including 11,960 acres with moderate potential for geothermal, 110 acres with high potential and 90 acres with moderate potential for slab lava, and 40 acres with high potential for cinders.	Development precluded on 8,660 acres plus an additional 440 acres if acquired. Includes 8,660 acres with moderate potential for geothermal. Acreages of other rated mineral potential same as all wilderness.
Livestock Grazing	No significant impact. Could preclude use of vehicles for stock watering.	No significant impact. Water hauling would be allowed.
Recreation Use	Minor reduction of vehicle-oriented recreation, primarily hunting. Enhancement of primitive recreation would offset this reduction. No change in overall use.	Same as all wilderness
Economic Value and Local Income	Decrease in annual economic value of $118. No change in local personal income. The maximum increase in transportation costs to livestock operators with grazing permits would be $118.	Same as all wilderness.

in the all wilderness, preferred, and partial alternatives would be manageable as wilderness. However, livestock management activities on the south portion of the WSA would complicate wilderness management. It is necessary to haul livestock water into that part of the study area on a daily basis for approximately four months of the year. The irregular land ownership pattern on the east side of the WSA could cause some management problems along the boundary. The area along the eastern boundary would be adversely affected by the sights and sounds of farming activities on private lands immediately adjacent to the wilderness.

The preferred alternative would resolve manageability problems caused by livestock water hauling by recommending as nonsuitable that portion of the WSA in which water is hauled. This alternative also recommends acquiring split-estate land on the east side of the area; this would eliminate boundary irregularity and would utilize a way as the boundary.

Rationale for the Selection of the Preferred Alternative

The preferred alternative would recommend as suitable the area containing the most wilderness values while recommending as nonsuitable lands where continued grazing practices would conflict with wilderness values and management. It would also recommend acquiring split-estate land to provide a more manageable, physically defined road boundary on the east side of the wilderness.

The benefits of preserving wilderness values in the portion recommended as suitable for wilderness would outweigh the benefits of leaving the area open for development of potential mineral or other resources.

Affected Environment

This section discusses only those activities or resources which influence the character of the study area, or that may be affected by the alternatives.

Wilderness Values

Naturalness

The WSA appears natural. The lava flow portion of the area is extremely rugged and precludes most activities which would physically mark the area. The surrounding sagebrush/juniper lands also appear essentially natural.

Man-made features in the WSA influence a very small percent of the area. (The area of influence is an estimate based on the acreage within the WSA from which these man-made features can be seen.)

The WSA contains some 7½ miles of vehicle ways, which cannot be seen from either side of the routes due to vegetative cover. There are two seedings on the east side of the WSA which cover some 392 acres. Although the seedings contain crested wheatgrass, a species not native to the area, the seedings generally appear similar to the surrounding native bunchgrass.

There are approximately 5½ miles of fence in the area and along its boundary. The fences are well masked by vegetation and topography along their routes and are not visible unless one is very close to the fence. There is a vault toilet near the Crack in the Ground. This site has very little impact on the area and affects only about an acre of land.

Opportunities for Solitude or Primitive and Unconfined Types of Recreation

Opportunities for solitude in the study area are outstanding, except in portions immediately adjacent to the boundary road on the west side of the WSA and at the vault toilet at the Crack in the Ground. The extreme ruggedness of the lava flow isolates visitors within a very short distance. The sagebrush/ juniper areas surrounding the flows generally offer more than adequate cover and topography to isolate the visitor.

Signs of human activity in the Christmas Valley area to the south, visible from the high points in the WSA, tend to emphasize the isolation within the WSA. Throughout most of the WSA, outside sights and sounds of farming activities are generally a positive aspect in this WSA which enhance rather than degrade solitude and primitive recreation. The only portion of the WSA where this is not the case is a narrow band along the east side.

Opportunities for wildlife observation, photography and general sightseeing are outstanding throughout the area. Many features unique to this area offer opportunities for geologic sightseeing. The Crack in the Ground is the best known geologic feature in the region and attracts many visitors who come to the Christmas Valley area just to see it.

Day hiking opportunities are abundant in the entire WSA. Longer backpacking and camping trips are available along the lava edge and in the sagebrush/ juniper areas. The flows are exceptionally rugged and offer limited camping sites. Hunting occurs in the WSA; it is not dependent on vehicle use, though vehicles are used outside the lava flow. Hunting opportunities are fair.

Special Features

The Crack in the Ground and the cinder cones in the WSA are significant geologic features not commonly available to the sightseer. The volcanic cones known as the Four Craters, which give the area its name, are highly scenic and colorful as viewed against the backdrop of the lava field and juniper cover surrounding them. Two of the cones are close enough to the boundary road for fairly easy access and they are popular hiking destinations. The view from the cones is spectacular, overlooking the whole Christmas Valley area and the desert east to Wagontire Mountain. The Crack in the Ground is a particularly unique scenic feature.

The WSA contains kipukas — areas of relatively undisturbed native vegetation in lava fields.

The study area is located in crucial deer winter range, and winter populations of deer in the area are high. The area also provides habitat for eagles, prairie falcons and other raptorial birds, as well as other nongame species of wildlife. The WSA is part of a wintering area for the northern bald eagle, which is federally listed as threatened in Oregon.

Several cultural resource sites are also located in the WSA.

Diversity in the National Wilderness Preservation System (NWPS)

According to the Bailey-Küchler System of classifying ecosystems, the Four Craters WSA is located in the Intermountain Sagebrush Province with a potential natural vegetation of sagebrush steppe with juniper. The WSA is in a transition zone between the ponderosa pine forest to the north and the sagebrush steppe to the south. Vegetative communities listed in the High Lava Plains section of the Oregon Natural Heritage Plan which occur in the WSA are western juniper/Idaho fescue, western juniper/big sagebrush/bluebunch wheatgrass and big sagebrush/Idaho fescue.

The WSA is within 5 hours' driving time of several standard metropolitan statistical areas with populations over 100,000: Eugene/Springfield, Medford, Portland, and Salem, Oregon.

Energy and Mineral Development

Energy and mineral resources were evaluated by BLM using available geologic data and data provided by Engineer's International, Incorporated (EII), a consulting firm under contract with BLM. The EII data is in a report titled "Geological Investigation and Mineral Inventory of Devil's Garden, Four Craters, and Squaw Ridge in Lake County, Oregon." Also used in the evaluation were the results of a BLM geologic/geochemical study.

The area has been classified according to a rating system that indicates both the potential for occurrence (geologic favorability) of certain minerals, as well as the quantity and quality of data on which the rating is based (confidence level). A description of the rating system is provided in the Statewide EIS volume.

Geothermal is the main potential energy resource in the area. Although no specific areas of geothermal potential have been identified in the WSA, the entire WSA is considered moderately favorable for geothermal resources based upon the recent volcanism and above-normal heat flow (characteristic of most of southeastern Oregon).

Portions of the WSA are considered to be highly favorable and moderately favorable for the occurrence of slab lava. Slab lava occurring near the margins of the lava flow is considered exploitable, but interior deposits are not readily accessible. In the past, slab lava has been sold and taken illegally from the nearby Devils Garden flow. Numerous inquiries to BLM's Lakeview District concerning purchase of slab lava attest to the demand for this decorative stone. Except for the Devils Garden, Squaw Ridge, and to a lesser extent, the Four Craters lava beds (all of them WSAs), stone of this quality is not available in the area for hundreds of miles.

A portion of the WSA is considered highly favorable for the occurrence of cinders. Most of the cinder deposits lack access. The northwestern-most cinder cone is readily accessible, and cinders have been produced from this source. Because of the scarcity of road and landscaping rock in the nearby area, there is a demand for cinders from this source; there have been inquiries about this source from the Lake County Road Department and individuals in the Christmas Valley area.

Table 3 shows the mineral potential classifications for the WSA. Map 5 shows the portions of the WSA rated high and moderate (medium) for slab lava and cinders.

There were no geothermal or oil and gas leases and no mining claims in the WSA, as of January 1, 1984.

Table 3. Classification of Energy and Mineral Potential, Four Craters Lava Bed WSA (OR-1-22)

Commodity	Area	Classification Level	Confidence Level
Metals (gold, silver, mercury)	Entire WSA	2	B
Geothermal	Entire WSA	3	B
Uranium/Thorium	Entire WSA	1	A
Coal	Entire WSA	2	B
Oil/Gas	Entire WSA	2	A
Limestone	Entire WSA	1	C
Bentonite	Entire WSA	1	B
Diatomite	Entire WSA	2	B
Zeolites	Entire WSA	1	B
Slab lava	See map 5	4	D
	See map 5	3	D
	Rest of WSA	2	C
Cinders	See map 5	4	D
	Rest of WSA	1	C

Legend:
Class 1 - Lack of indications of favorability
Class 2 - Low favorability
Class 3 - Moderate favorability
Class 4 - High favorability
Confidence Level A - Insufficient data or no direct evidence
Confidence Level B - Indirect evidence available
Confidence Level C - Direct evidence but quantitatively minimal
Confidence Level D - Abundant direct and indirect evidence

The main mineral deposits within the WSA consist of slab lava and cinders.

The main feature of the WSA is the Quaternary Four Craters lava flow characterized by aa-type (rough) basaltic lava. A series of northwest trending cinder cones traverse the western half of the flow. The remaining portion of the WSA, outside of the Four Craters flow, is covered with Quaternary to Tertiary basalt flows. The subsurface geology is largely unknown, but pre-Tertiary marine sedimentary rocks may exist at depth.

Vegetation

The WSA consists mainly of western juniper/big sagebrush/bunchgrass communities. Wildfire plays a major role in the vegetative community of the WSA and the frequent fires on the lava generate more vegetative diversity, resulting in various transition stages in the vegetative composition. The rugged, irregular surface of the lava is heavily vegetated, either by trees, grasses, shrubs, or mosses.

The vegetative communities in the WSA range from early seral in heavily disturbed areas to climax condition on portions of the flow. (Seral refers to a stage of ecological condition based on the difference between the present plant community and climax vegetation, the relatively stable, final stage in plant succession.)

Juniper is the dominant tree species in the WSA. Shrubs consist of big sagebrush, bitterbrush, wax currant, desert-sweet, rabbitbrushes, and gland ocean-spray. Grasses in the WSA include Idaho fescue, bluebunch wheatgrass, Thurber's needlegrass, Indian ricegrass, bottlebrush squirreltail, Junegrass, bluegrasses and cheatgrass. Two burns in the WSA were seeded about 10 years ago to crested wheatgrass.

Wildlife

The WSA is part of the Paulina Big Game Management Unit and is crucial winter range for the Devils Garden deer herd. Two to three thousand deer use the lava field for some or all of their wintering habitat. The only wildlife improvement project in the WSA (among the man-made features mentioned in the Naturalness section) is a crested wheatgrass seeding in the northeast quarter of the WSA. This was a fire rehabilitation project and was partially financed by the Oregon Department of Fish and Wildlife because of the crucial habitat involved.

The WSA is also part of a wintering area for the northern bald eagle, which is federally listed as threatened in Oregon. It supports wildlife such as coyotes and bobcats; occasional cougar sightings are reported. Birds in the WSA include sage grouse, doves, quail, flickers, numerous common passerines (common songbirds), owls and several species of hawk.

Livestock Grazing

Portions of 2 livestock grazing allotments are within the WSA. Table 4 shows the existing use in AUMs (animal unit months, the amount of forage needed to sustain one cow and a calf, or equivalent animals, for one month).

Existing livestock projects in the WSA (among the man-made features mentioned in the Naturalness section) include 5½ miles of fence.
No livestock improvements are proposed for the area.

The grazing operators currently use vehicles for daily watering of stock in the Crack in the Ground allotment, and for various range work such as salting during the use period on both allotments. Livestock are gathered on horseback at the end of the use period.

Some vandalism to stock and developments has occurred in the general area of the WSA.

Wood Products Harvest

Within the WSA, there is potential for sales of juniper on 1,360 acres for firewood or posts. There is limited demand for juniper within the WSA and other sources are available outside the WSA in the region.

Cultural Resources

Several archeological sites are known to exist in the WSA. The remains of collapsed buildings and a rock-lined well of an early homestead are located in

Table 4. Existing Livestock Use, Four Craters Lava Bed WSA (OR-1-22)

Grazing Allotment	Licensed AUMs in Allot.	Period of Use	Percent of Allot. in WSA	Current Actual Use in WSA (AUMs)
East Green Mtn. (No. 101)	980	4/21-11/30	23	387
Crack in the Ground (No. 102)	298	5/01-09/15	23	236
Totals	1,278			623

the southern end of the WSA. There is high potential for additional prehistoric sites to be discovered. The many coves and small caves in the lava and at the edges of the lava flow have a high potential for primitive occupancy sites. Sites are not likely to occur in the lava flow itself.

Recreation Use

The Crack in the Ground is probably receiving more recreation use than any other site in the Christmas Valley area. The crack is reached by roads; most people drive to the edge of the crack and then walk down into the fissure for approximately the first half mile. A vault toilet is only a few hundred yards from the boundary road.
Recreation use on the lava flows is high at the northern two cinder cones. A considerable number of people hike the cones each year, judging from the trails that have been formed. The south part of the WSA is used by hunters who cross the area in vehicles, as well as by walking.

There is no vehicle recreation in the lava flow area due to the extremely rugged terrain. The east and south side of the WSA is more amenable to vehicle access. Population in the Christmas Valley area has grown (70 percent increase from 1970-1980 in north Lake County) and recreation use on all of the surrounding desert has been increasing. Although a recent moratorium on water use for agriculture may lead to a leveling of population in the Christmas Valley area in the near future, a leveling of population in the Christmas Valley area in the near future, populations of the Bend/Redmond/La Pine areas are still increasing and recreationists from this area use the desert around Christmas Valley.

Economic Value and Local Income

Livestock grazing and recreation are the only resource outputs which generate economic activity in this WSA. The WSA currently produces 623 animal unit months (AUMs) of livestock forage and an unknown amount of recreation activity annually. As of January 1, 1984, there were oil and gas leases or geothermal leases on the WSA.

The economic value of existing outputs amounts to $4,697 annually, and local personal income generated by existing outputs amounts to $6,398 annually. The terms economic value and local personal income are discussed in the Statewide EIS volume.

Environmental Consequences

This section discusses the environmental consequences of implementing each of the alternatives. Resources and activities not significantly affected by any of the alternatives are not discussed. General impact conclusions applicable to all WSAs including impact conclusions based on speculative future developments (developments which are possible, but are not currently proposed) are discussed in the Statewide EIS volume. That volume also discusses certain assumptions that were made for this analysis.

Effects on Wilderness Values

The **all wilderness alternative** would add all 11,960 acres of public land in the WSA to the National Wilderness Preservation System (NWPS). It would preserve wilderness values on the rugged terrain of the lava flow and cinder cones and on the sagebrush and juniper lands surrounding the flow; it would also preserve special wilderness features such as habitat for a variety of wildlife species, a variety of native plant communities, and the scientific and educational values of the Crack in the Ground, the cinder cones and lava flows.

Some 7½ miles of vehicle ways would revegetate under this alternative and would be unnoticeable after a short time, enhancing naturalness. The elimination of vehicles would also enhance opportunities for solitude and primitive recreation.

The **preferred alternative** would add 9,100 acres to the NWPS, assuming 440 acres of split estate could be acquired. Wilderness values in all of the lava flow, the cinder cones, the Crack in the Ground, and approximately 3,600 acres of sagebrush and juniper lands outside the flow would be preserved. Closure of 2 miles of ways would enhance wilderness values.

Wilderness values on 3,300 acres outside the lava flow and recommended as nonsuitable for wilderness in the preferred alternative would be adversely affected if minerals or other resources on the lands were developed.

The **partial alternative** would add 5,090 acres to the NWPS. It would preserve wilderness values in the lava flow, on the cinder cones, and at the Crack in the Ground. Wilderness values on all of the sagebrush and juniper lands outside the lava flow would be subject to adverse effects from development of mineral or other resources.

Continued vehicle use in the area outside the flow would also have adverse effects on wilderness values. As population in the Christmas Valley area grows, additional use of recreational vehicles would add to the trail system and adversely affect wilderness values.

The **no wilderness/no action alternative** would leave the area outside the lava flow open to possible range improvements, including vegetative manipulation and structural projects, which would alter the natural condition of the area. The cinder cone on the north end of the WSA could be developed as a cinder source for Lake County. This would adversely affect opportunities for solitude and primitive recreation in the north end of the WSA, as well as causing permanent changes in the shape of the cinder cone. There is a potential for removal of slab lava from the WSA. The removal of cinders and slab lava would result in traffic increases on access roads, which would adversely affect the area's naturalness, opportunities for solitude and primitive recreation, and special wilderness features.

Effects on Energy and Mineral Development

Areas designated wilderness would be withdrawn from mineral exploration and development. Acreage that would be withdrawn under each of the alternatives, including areas rated high and moderate for minerals, are shown in table 5.

Effects on Livestock Grazing

There would be no significant impacts to existing livestock use in the WSA under any of the alternatives.

Under the **all wilderness alternative,** the use of vehicles for watering of stock in the Crack in the Ground allotment could be restricted, unless there were no practical alternative to using vehicles. Some vandalism to stock and developments has occurred in the general area of the WSA and the elimination of vehicle access inside the area could lead to control or reduction of such vandalism.

The **preferred alternative** would allow grazing operators vehicle access to suitable watering sites in the Crack in the Ground allotment.

The **partial** and **no wilderness/no action alternatives** would not affect grazing.

Effects on Wood Products Harvest

Under the **all wilderness** and **preferred alternatives,** cutting of juniper for firewood or posts would be precluded on 1,360 acres and 920 acres, respectively; however, no significant impacts are expected because there is only limited demand for the wood within the WSA and other nearby sources are readily available.

Table 5. Effects of Alternatives on Energy and Mineral Development, Four Craters Lava Bed WSA (OR-1-22)

	Acres Withdrawn			
	All Wilderness	Preferred	Partial	No Wilderness/ No Action
Total acres	11,960	8,660[1]	5,090	0
Geothermal rated moderate	11,960	8,660	5,090	0
Slab lava rated high	110	110	110	0
Slab lava rated moderate	90	90	90	0
Cinders rated high	40	40	40	0

[1] Development also precluded on an additional 440 acres if split estate is acquired as proposed under this alternative.

There would be no impact to wood products in the **partial** and **no wilderness/no action alternatives** because the juniper-covered lands would be in the areas recommended nonsuitable.

Effects on Recreation Use

The **all wilderness alternative** would restrict vehicle access and avoid conflicts between primitive and vehicle-oriented recreation uses, thereby enhancing the primitive recreation experience outside of the lava flow. This alternative would still allow access to the vault toilet at the Crack in the Ground but would close the trail east of the Crack to vehicles. This would restrict the vehicle-oriented recreation in this part of the WSA. The east side of the WSA currently receives very little vehicle recreation use other than hunting. There would probably be a slight reduction in hunting with the restriction of vehicles in the south and east parts of the WSA. On the north end of the area, the distances from the boundary to the lava flow are short and the impact on hunting in this area would not be significant. There would be no net change in overall recreation use.

The **preferred alternative** would have similar impacts as the all wilderness alternative but to a much lesser degree because most of the east side of the WSA would remain open to vehicles along the boundary road and trail. Furthermore, the eastern part and south end of the WSA would not be designated as wilderness. As a result, the impacts to most vehicle-related recreation would not be substantial. Access in the vicinity of the Crack in the Ground would be the same as under the all wilderness alternative. There would be no net change in overall recreation use.

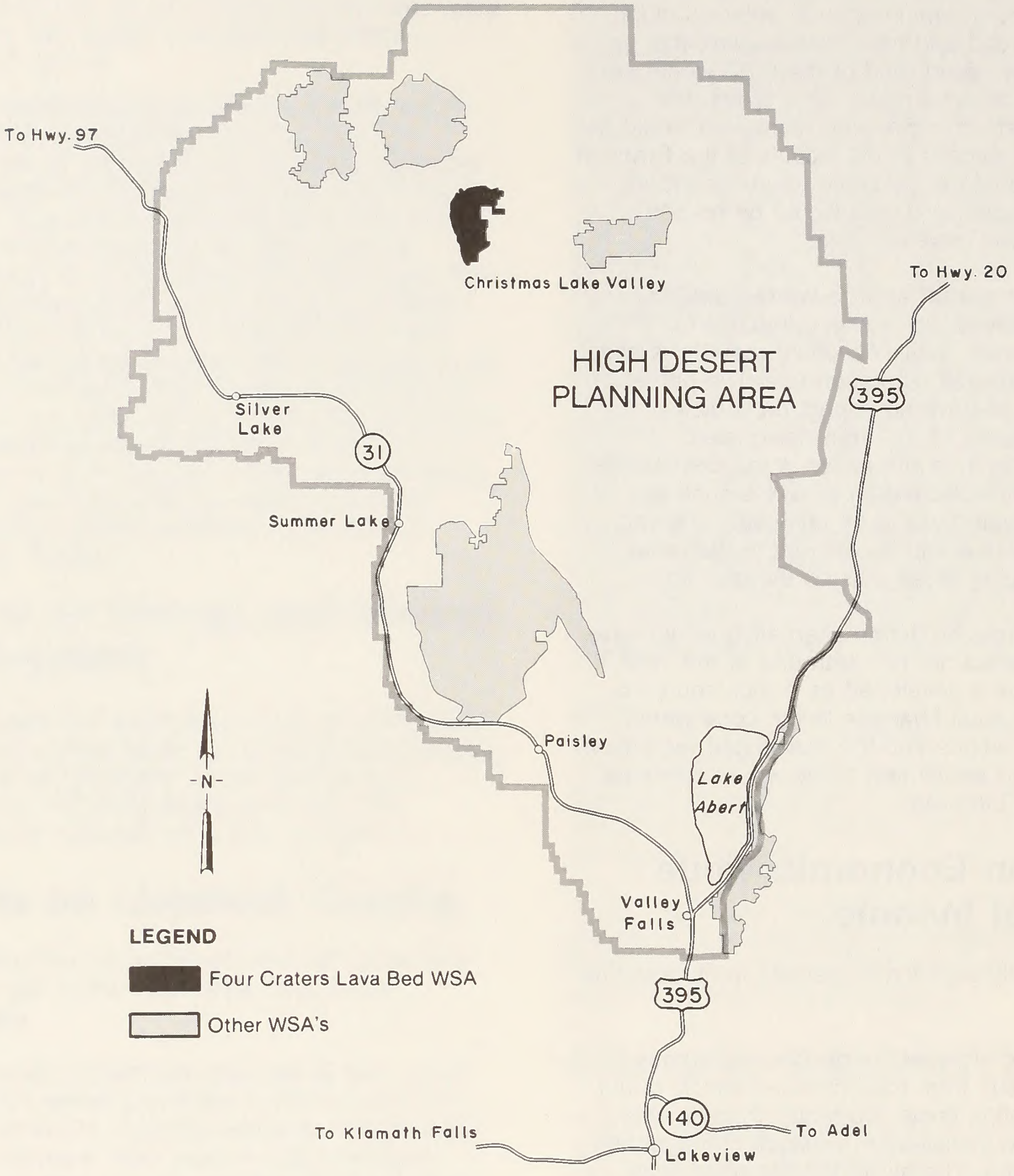
Under both the **partial** and **no wilderness/no action alternatives,** the adverse impacts to primitive recreation activities would result in a slight net decline in overall recreation use. The partial alternative would have no impact on vehicle-oriented recreation as the area designated wilderness under this alternative is inaccessible to vehicles. Primitive recreation activities such as hiking and camping would be adversely affected, because vehicles would be allowed in the more favorable camping areas outside the lava flow.

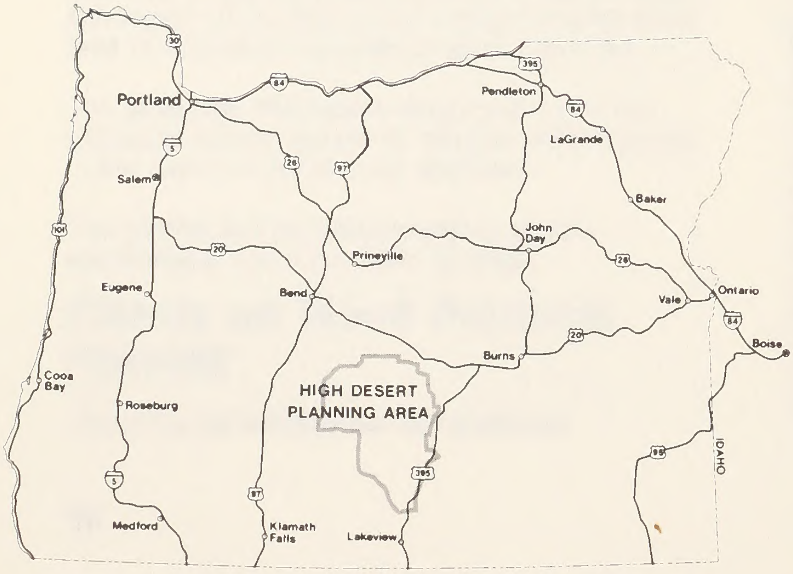
The no wilderness/no action alternative would have a substantial effect on the north end of the WSA if the cinder cone is developed as a rock source by the county. Physical changes to the cone would alter aesthetic values and the associated recreation, and vehicle and equipment traffic would eliminate the solitude in the area.

Effects on Economic Value and Local Income

No economically significant changes in outputs are expected.

The only economic effect under the wilderness alternatives result from road closures which would increase operating costs. Currently, there is little dependence on vehicles for livestock management in the study area. The all wilderness alternative would restrict such vehicle use unless there were no practical alternative. The maximum impact from road closures upon the grazing operator in the WSA would be an increase in cost of about $118 per year.





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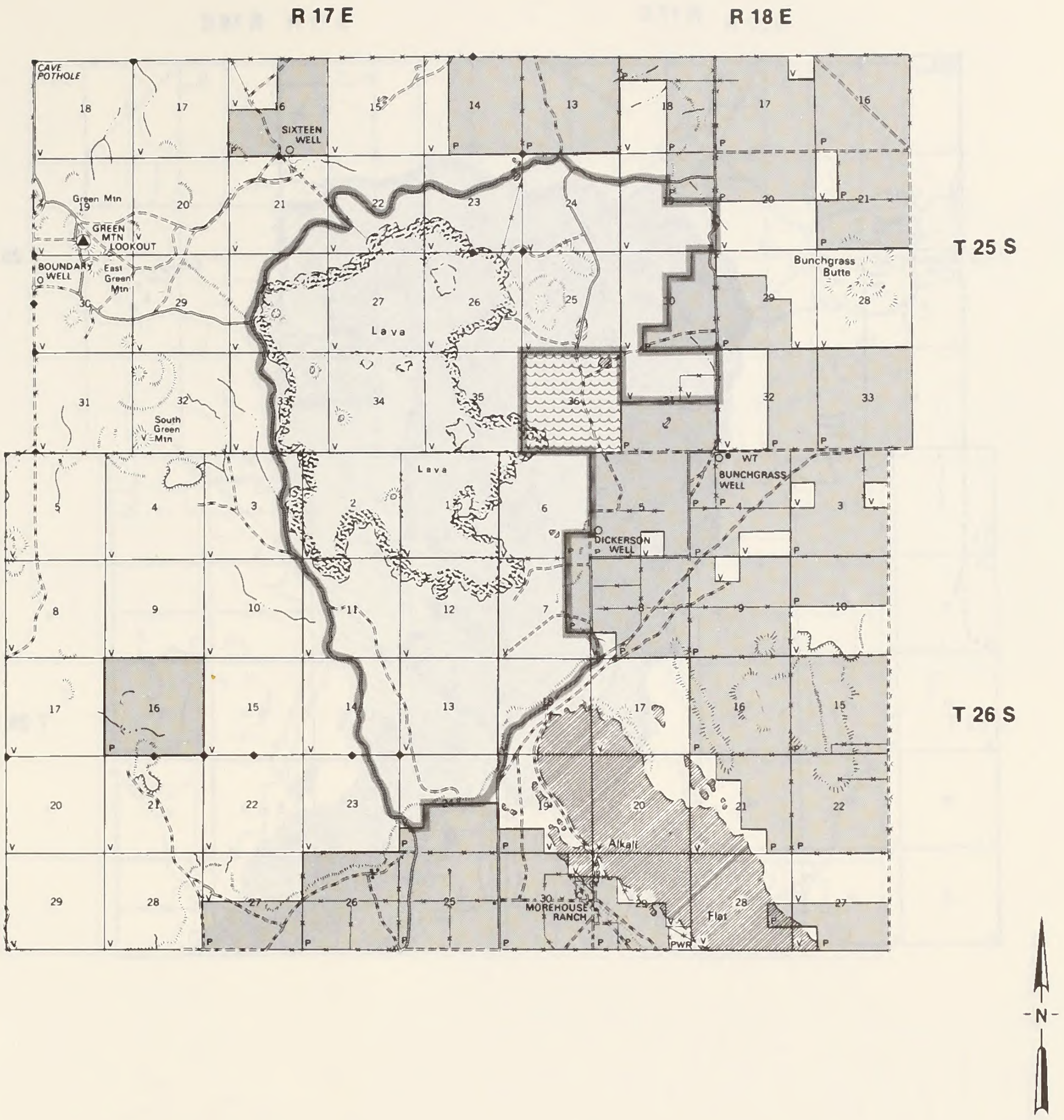
Lakeview District

Four Craters Lava Bed WSA
OR-1-22

LOCATION MAP

10 0 10 MILES

MAP 1



LEGEND

▬ Wilderness Study Area Boundary

☐ Bureau of Land Management

▨ Private

▤ BLM Surface-State or Private Subsurface (Split Estate)

▦ Edge of Lava

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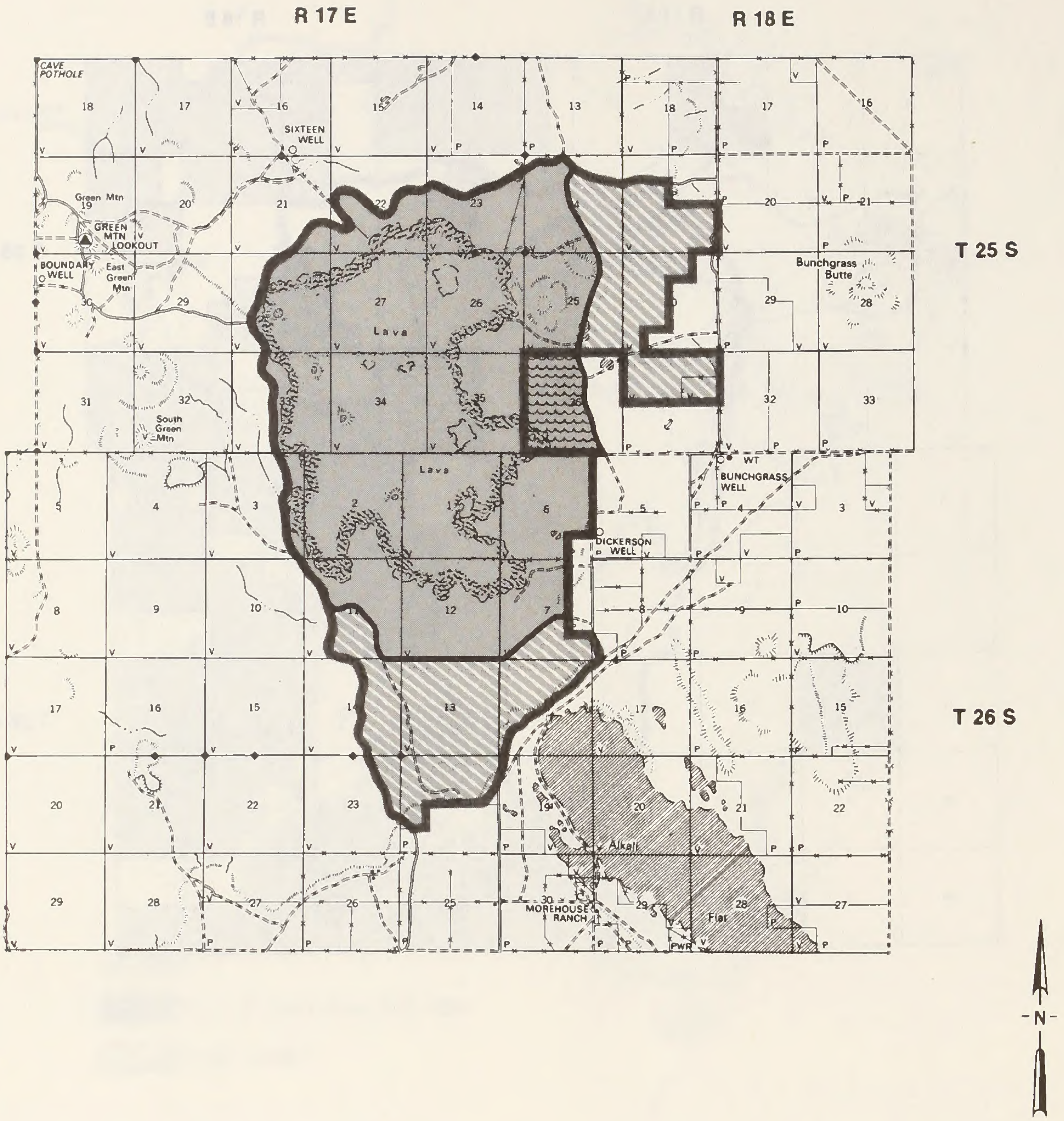
Lakeview District

Four Craters Lava Bed WSA
OR-1-22

LAND OWNERSHIP

1 0 1 2 MILES

MAP 2



LEGEND

- ▬ Wilderness Study Area Boundary
- ▩ Recommended Suitable for Wilderness
- ▨ Recommended Non-suitable for Wilderness
- ≋ Non-Federal Minerals (Split Estate) within Area Recommended for Wilderness

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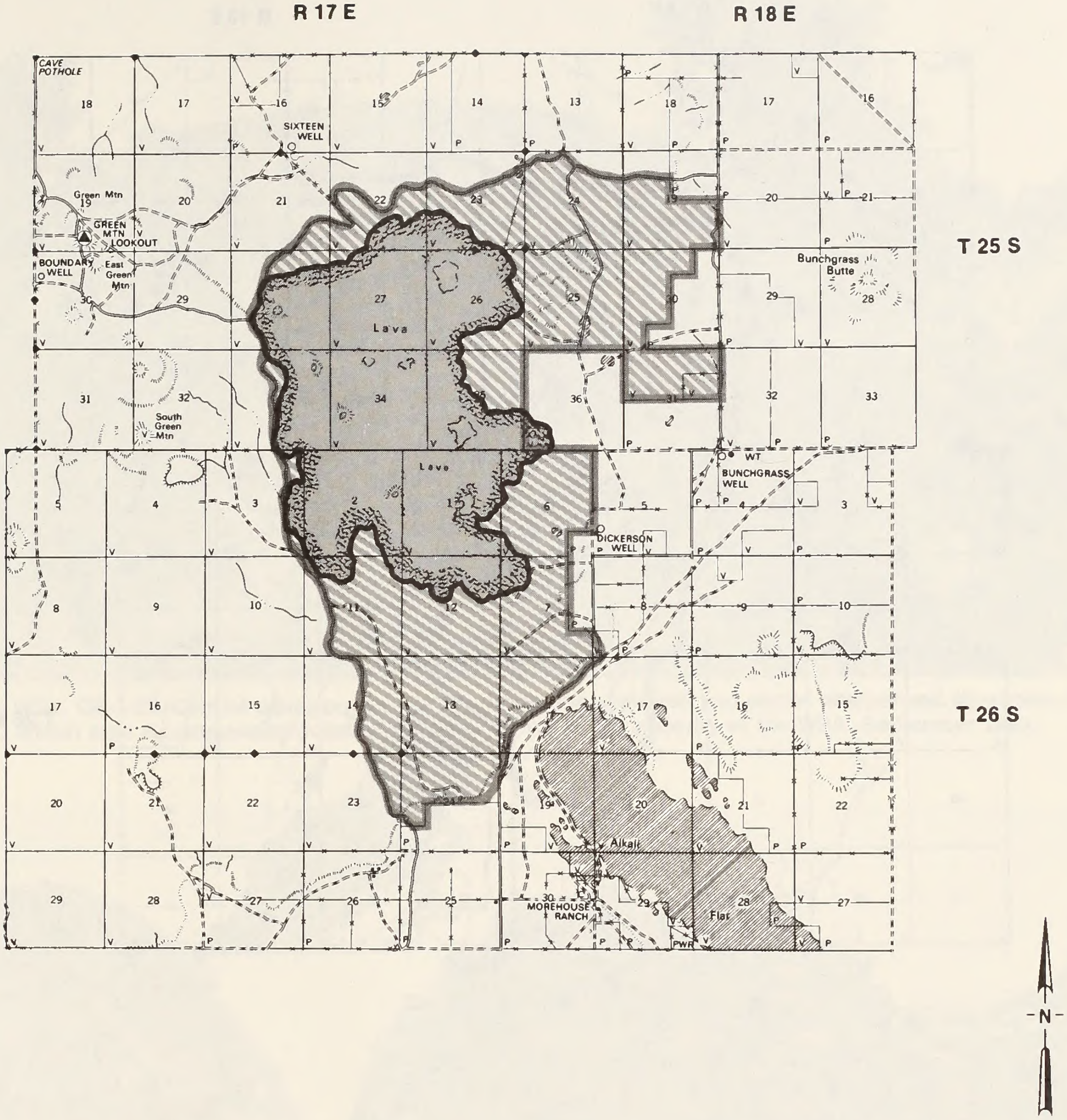
Four Craters Lava Bed WSA
OR-1-22

PREFERRED ALTERNATIVE

1 0 1 2 MILES

MAP 3



LEGEND

- ▬ Wilderness Study Area Boundary
- ■ Recommended Suitable for Wilderness
- ▨ Recommended Non-suitable for Wilderness
- ▤ Non-Federal Minerals (Split Estate) within Area Recommended for Wilderness

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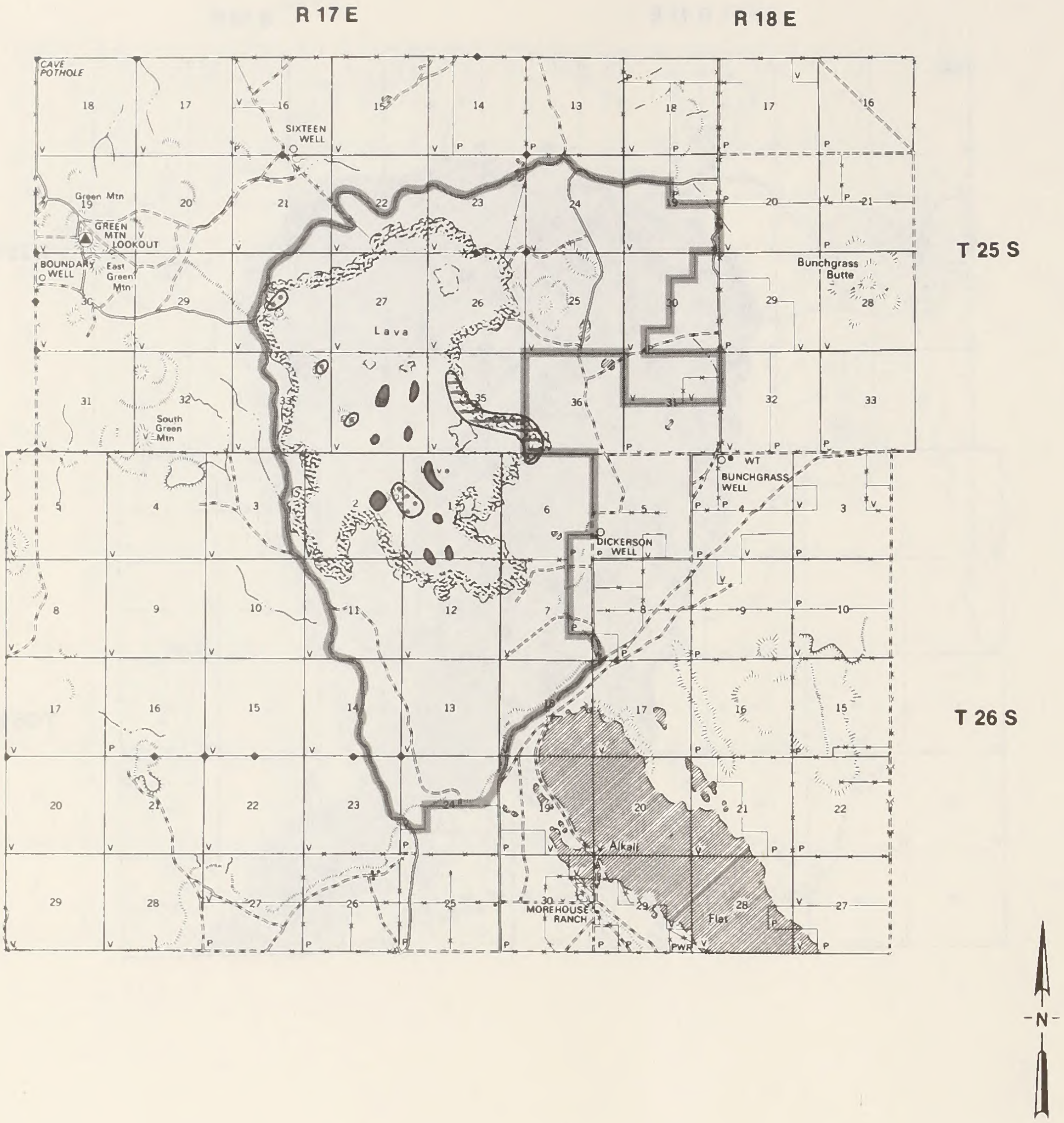
Four Craters Lava Bed WSA
OR-1-22

PARTIAL ALTERNATIVE

1 0 1 2 MILES

MAP 4



Entire WSA:
Medium Potential
(3B) for Geothermal Resources

▇ **High Potential**
(4D) for Slab Lava

▤ **Medium Potential**
(3D) for Slab Lava

░ **High Potential**
(4D) for Cinders

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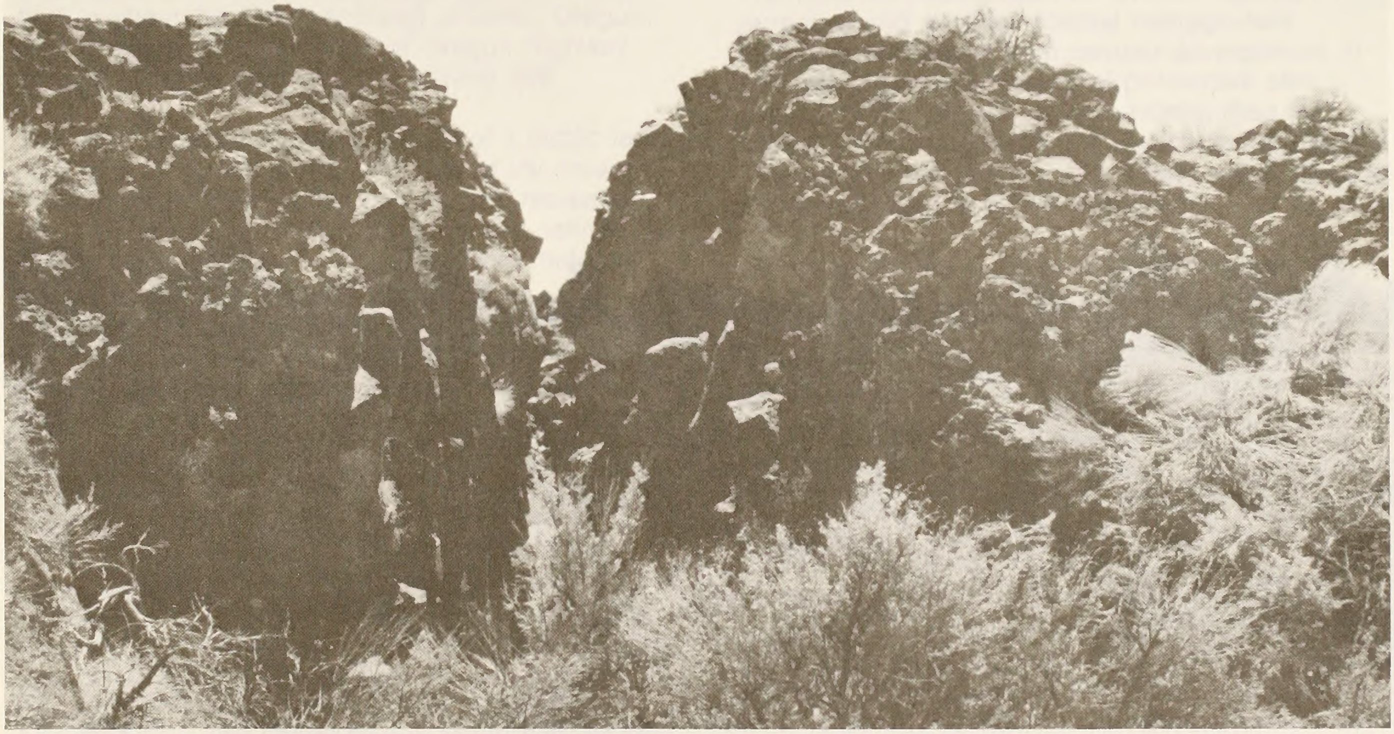
Four Craters Lava Bed WSA
OR-1-22

MEDIUM OR HIGH POTENTIAL MINERAL OR ENERGY RESOURCES

1 0 1 2 MILES

MAP 5

Four Craters Lava Bed WSA, OR-1-22. Central crater on the west side of the WSA. Within area recommended suitable under the preferred and partial alternatives. Illustrates terrain typical of the majority of the WSA. September 1983.



Four Craters Lava Bed WSA, OR-1-22. In the southeast corner of the WSA. Within the area recommended suitable under the preferred and partial alternatives. Shows a lava stress fracture similar to the "Crack-in-the-Ground" on the west side of the WSA. May 1982.

Four Craters Lava Bed WSA, OR-1-22. Cinder cone and lava flow on the west side of the WSA. Within the area recommended suitable under the preferred and partial alternatives. Typical of the terrain in the west side of the WSA. June 1979.

Four Craters Lava Bed WSA, OR-1-22. In the south half of the WSA looking north. Within area recommended suitable under the preferred and partial alternatives. Illustrates open terrain found in the south and east parts of the WSA, including areas recommended nonsuitable under the preferred and partial alternatives due to conflicts with range management. September 1983.

Appendix to the Wilderness Environmental Impact Statement for Oregon

Sand Dunes Wilderness Study Area
(OR-1-24)

General Description of Study Area

The Sand Dunes wilderness study area (WSA) is located in Lake County, nine miles northeast of the small town of Christmas Valley, Oregon (see map 1). It is about 70 miles southeast of Bend, Oregon, approximately 30 miles north of Oregon Highway 31, and 30 miles west of U.S. Highway 395.

The WSA contains 16,000 acres, all of it public land (see map 2). Lands surrounding the study area are used primarily for livestock grazing and recreation. Small portions of the WSA boundary are defined by private land and a section of split estate (federally managed surface, private or state owned subsurface mineral rights). Most of the land outside the area is public land managed by BLM. Boundaries on the remainder of the WSA are defined by roads on the north and east, a 750-kV powerline on the west, and by legal land subdivisions on the south.

The majority of the study area is comprised of unstabilized sand dunes, rising to a maximum height of some 60 feet. Vegetation in the dunes is somewhat limited. There is some vegetative stabilization of the dunes on the south and east portions of the WSA. A portion of the WSA (inside the Lost Forest) contains sagebrush, juniper and some ponderosa pine. There is no perennial water in the area. A well drilled several years ago on the north edge of the study area is not actively used. There are seasonal springs in the area and on the north boundary.

Interrelationships

A 960-acre portion of the Lost Forest Research Natural Area (RNA) is within the WSA (see map 3). The boundary road of the WSA separates this portion of the RNA from the remainder of the RNA. The RNA was designated in 1972 for research purposes and receives special management, including withdrawal from mineral development. It consists of a disjunct stand of ponderosa pine occurring in a climate lower in rainfall than that normally associated with this vegetative community. The sand dunes and the sandy soils within the Lost Forest represent a unique ecosystem.

All research natural areas and primitive areas in existence at the time of the Federal Land Policy and Management Act (FLPMA) were designated as Instant Study Areas (ISA). They were so named because the deadline for completion of the wilderness study was accelerated from the 1991 reporting date for the remaining wilderness study areas to be identified in inventories. The BLM Oregon State Director's 1979 report on the Lost Forest Instant Study Area concluded that the majority of the Lost Forest ISA did not have wilderness characteristics and therefore should not be recommended for wilderness designation. It also concluded that the portion of the Lost Forest RNA/ISA within the Sand Dunes WSA should be incorporated in the study of the Sand Dunes WSA.

A portion of the WSA also includes an area closed to vehicles because of the Fossil Lake paleontologic area immediately west of the WSA. Some 4,160 acres of the WSA are within this fenced vehicle closure. Fencing was completed in the summer of 1983.

The significant resource values in the general area and potential for conflicting uses led to the Fossil Lake, Sand Dunes, and Lost Forest areas being designated as an Area of Critical Environmental Concern (ACEC) as well, in 1983. The ACEC encompasses 30,000 acres, including all of the WSA.

Special management restrictions in the ACEC or RNA include:

- limiting off-road vehicles (ORVs) to existing routes in the RNA,
- RNA withdrawn from locatable mineral development,
- closure of the Fossil Lake area to ORVs (remainder of Sand Dunes open to ORV use), and
- prohibiting firewood cutting or any other timber removal.

The management restrictions in the ACEC and RNA would continue to apply within the WSA regardless of whether or not the area is designated wilderness.

Issues

Issues relating to each WSA were raised by BLM and the public during the wilderness inventory and EIS planning and scoping process. These issues concern both the effects of wilderness designation on existing and potential land uses or resources in the WSA, as well as the effects of existing and potential land uses or resources on wilderness values. Land uses or resources raised as issues specifically for this WSA include:

- the unique ecosystem in the Sand Dunes/Lost Forest complex,
- off-road-vehicle use and the primitive recreation values in the area,
- whether other areas offer equivalent opportunities for ORV use (i.e., where else in the region are sand dunes open to ORV use?), and
- possible changes in the character of the dunes from ORV use.

Also raised as an issue was whether the WSA would be manageable as wilderness.

Description of the Alternatives

The following alternatives are analyzed:

- all wilderness no wilderness/no action (preferred alternative)

An enhanced wilderness alternative is not included in the analysis because there is no practical way of enhancing the wilderness characteristics of the area. A partial alternative is not analyzed because there is no way of resolving or minimizing conflicts between wilderness management and other types of land use by recommending only a portion of the area as suitable for wilderness. There is also no topographic or other identifiable feature within the area that would make a better wilderness boundary than the present WSA boundary.

All Wilderness

The all wilderness alternative would recommend all 16,000 acres of public land in the WSA suitable as wilderness (see map 2).

No Wilderness/No Action (Preferred Alternative)

The no wilderness/no action alternative would recommend the entire WSA nonsuitable as wilderness. It represents the situation most likely to occur without wilderness designation. The area would be managed according to the current land use plan, which includes the following features relevant to this analysis:

- continued ORV recreation, except where restricted in ACEC/RNA, and
- continued availability for mineral exploration and development, except as restricted in the ACEC/RNA.

Table 1 summarizes the proposed management of the WSA under each alternative.

Table 2 summarizes the environmental consequences of each alternative.

Manageability of the Area as Wilderness

The Sand Dunes WSA would not be manageable

Table 1. Summary of Proposed Management Under Each Alternative, Sand Dunes WSA (OR-1-24)

Proposed Management	All Wilderness	No Wilderness/No Action
Acres Designated as Wilderness	16,000	0
Acres Closed to ORVs by Wilderness Designation[1]	11,840	0
Miles of Ways Closed	4	0
Acres Withdrawn from Mineral Location and Leasing by Wilderness Designation[2]	15,040	0

[1] Approximately 4,160 acres are currently closed to vehicle use under the existing land use plan.

[2] Approximately 960 acres are currently withdrawn from all forms of mineral location and leasing under the Lost Forest Research Natural Area designation.

as wilderness. The openness of terrain, easy access from existing roads and the long standing public acceptance of off-road vehicle use in the area would require extensive commitment of personnel as well as physical barriers to prevent such use from continuing. The actions necessary to enforce total ORV elimination would of themselves degrade much of the wilderness value of the area.

Rationale for Selection of the Preferred Alternative

The no wilderness/no action alternative is preferred because the area could not be managed as wilderness.

The California Desert Conservation Area has had experience with such vehicle closures as would be required at the Sand Dunes. They have found that even with public support for closures in areas less popular and farther from user populations, enforcement of the closures has been difficult and costly. A portion of the Sand Dunes is closed and this action is supported by ORV organizations. However, because there is no nearby alternate site with the same type of conditions as at Sand Dunes, there is extreme resistance to closing what remains open to ORV use at this site.

Although portions of the WSA have outstanding opportunities for solitude, they exist on only small portions of the WSA. Although opportunities for some primitive recreation activities are unique, overall they are limited in the WSA and less than outstanding.

Table 2. Summary of Environmental Consequences of Alternatives, Sand Dunes WSA (OR-1-24)

Resource or Activity	All Wilderness	No Wilderness/No Action (Preferred Alternative)
Wilderness Values	Would add 16,000 acres to the NWPS and preserve unique paleontological, cultural, and natural features. Solitude would be enhanced by prohibiting vehicles.	Continued ORV use would preclude solitude potential during high use periods and adversely affect primitive recreation. Some disturbance of natural values would continue. Potential mineral development could adversely affect wilderness values and multiple resource benefits.
Energy and Mineral Development	Development precluded on 16,000 acres, including 16,000 acres with moderate potential for oil and gas and geothermal, and 12,930 acres with moderate potential for diatomite. 960 acres within RNA already withdrawn from mineral location.	No impact. WSA open to mineral development, except on 960 acres within RNA already closed to mineral location.
Vegetation	Vegetation preserved. Recovery of vegetation in trails on the north portion of the area. Some potential for change in unstablized dunes and minor change in stable dunes on east.	Continued ORV use would prevent recovery of vegetation on trails and remove some vegetation in stable dune areas. Unstablized dunes would have lower vegetation production due to disturbance.
Livestock Grazing	Minor change in management practices due to access limitations.	No impact.
Recreation Use	Loss of several thousand visitor days attributed to ORV use. Little increase in primitive recreation. Substantial net reduction in overall recreation.	No substantial change. Overall recreation use would continue at or near present levels.
Economic Value and Local Income	Unknown losses in economic value and local personal income as a result of reduction in recreation use.	No impact.

Affected Environment

This section discusses only those activities or resources that influence the character of the study area, or that may be affected by the alternatives.

Wilderness Values

Naturalness

A natural appearance is maintained in most of the WSA because the shifting of sand quickly alters evidence of man's presence. On the perimeter of the WSA where more vegetative stabilization has occurred, several deeply cut ways (vehicle routes established and maintained solely by the passage of vehicles) are evident. These ways are in the Mound Springs and Sand Dunes Well areas within the WSA and on private lands just outside the boundary. The vehicle ways total approximately four miles within the WSA and are not noticeable from any great distance to either side.

An unused well is located on the north edge of the WSA; only the capped casing is visible at the site. There are 7 miles of fence in the WSA, 3 miles on the far east side just inside the boundary and 4 miles inside the WSA as part of the ORV closure. These fences do not have any substantial effect on the naturalness of the area as a whole. The fence along the east boundary is being covered by sand and will be replaced with a fence just outside the WSA.

Man-made features inside the WSA influence about 1 percent of the study area. (The area of influence is an estimate of the acreage within the WSA from which these features can be seen.) There are no features inside the WSA which would detract from the naturalness of the WSA as a whole.

The 750-kV DC powerline running just outside the west boundary of the area is an outside influence that can be seen for one mile into the WSA.

Opportunities for Solitude or Primitive and Unconfined Types of Recreation

The Sand Dunes WSA offers outstanding opportunity for solitude in the central portion where the largest sand dunes occur and where distance from the boundary exceeds one mile. This is approximately one-third of the WSA. Opportunities for solitude on the northern and western fringes of the WSA are limited by the outside sights, and primarily by the sounds, of agricultural and recreation activity, e.g., tractors, trucks, and other machinery operating outside the area.

In the Lost Forest portion of the WSA, visual isolation is aided by the juniper cover and scattered pines, but sounds travel extensively within the area and can affect feelings of solitude. The openness of terrain in the WSA outside the large dunes, notably on the west, leaves one visible to others in the WSA. At best, the remaining areas outside the major dunes offer fair to good opportunities for solitude.

Opportunities for primitive recreation in the WSA include photography, nature study and sightseeing in a unique ecosystem. Such recreation opportunities are not matched elsewhere in Oregon. The ocean dunes have a different character, as do the dunes of the Alvord Desert and other smaller dunes in the eastern part of the state.

The WSA offers the opportunity for observation and study of paleontological materials. The Fossil Lake area is the "type site" (where a species is first discovered) for a number of fossils discovered here. Collection of other than invertebrate fossils is prohibited by law, however. Campers experience harsher conditions here than normally associated with primitive camping and backpacking; however, it does appeal to many primitive recreationists.

Special Features

The Sand Dunes WSA includes the major portion of the largest inland moving sand dune system in Oregon and possibly the Pacific Northwest. This large sand dune system supports the Lost Forest, a disjunct stand of ponderosa pine growing in an area of low rainfall (about 9.5 inches annually). Higher amounts of rainfall (14 or more inches) are normally required for this species. Due to the sand dunes and water retention in the soils, the pine forest survives in this low-rainfall area.

The area has numerous cultural and paleontological sites. (The Cultural Resources section further discusses these sites.) The area has been recognized as extremely important for the study of Pleistocene-age animals.

The unstabilized dune system visually contrasts with the surrounding High Desert terrain and is highly scenic and unique. The dunes offer dramatic interplay of light and texture.

Diversity in the National Wilderness Preservation System (NWPS)

According to the Bailey-Küchler system of classifying ecosystems, the Sand Dunes WSA is located in the Intermountain Sagebrush province and has a potential natural vegetation of sagebrush steppe. Vegetative communities listed in the High Lava Plains portion of the Oregon Natural Heritage Plan and occurring in the WSA are: ponderosa pine/big sagebrush communities, ponderosa pine-western juniper/big sagebrush community, dunes and shifting sands vegetation, playas and associated greasewood flats.

The WSA is within 5 hours' driving time of several standard metropolitan statistical areas with population over 100,000: Eugene/Springfield, Portland, Medford, and Salem, Oregon.

Energy and Mineral Development

Energy and mineral resources were evaluated by BLM using available geologic data in a report prepared by the U.S. Geological Survey and U.S. Bureau of Mines titled "Mineral Resources of the Lost Forest Instant Wilderness Study Area, Oregon." The area has been classified according to a rating system that indicates both the potential for occurrence (geologic favorability) of certain minerals, as well as the quantity and quality of data on which the rating is based (confidence level). A description of the rating system is provided in the Statewide EIS volume.

Geothermal resources and oil and gas are the two main potential energy resources that may be present. Although no specific areas of geothermal potential have been identified in the WSA, the entire WSA is rated moderately favorable for occurrence of geothermal resources, based upon fairly recent volcanism and above-normal heat flow (characteristic of most of southeastern Oregon). Based upon a statewide pattern of oil and gas potential, and the possibility of marine sedimentary rocks at depth, the entire WSA is rated with moderate favorability for the occurrence of oil and gas.

Most of the area is moderately favorable for the occurrence of diatomite, although no deposits are evident on the surface. The area has low favorability for metals, based on slightly anomalous values obtained from geochemical samples and the possibility of epithermal (low temperature) mineralization in the subsurface.

Because of the possibility of evaporites in buried playa deposits, there is a low favorability for sodium, potassium and borates in most of the WSA.

In the western portion of the WSA, there is a low favorability for the occurrence of mercury, copper, and silver; these are strategic and critical minerals, but there are no known deposits of such minerals.

Table 3 gives the mineral potential classifications for the WSA. Map 4 shows the portion of the study area rated moderate (medium) for diatomite.

Most of the WSA is covered by Late Pleistocene and Holocene active and stabilized sand dunes, and underlain by Pleistocene lake deposits and Tertiary basalts and tuffaceous sedimentary rocks. The older subsurface geology is largely unknown, but pre-Tertiary marine sedimentary rocks may exist at depth.

There are no known mineral deposits within the WSA. There were no geothermal or oil and gas leases and no mining claims in the study area as of January 1, 1984.

Vegetation

The eastern end of the WSA contains the Lost Forest, an isolated remnant population of ponderosa pine. This portion of the WSA also contains junipers, big sagebrush, rabbitbrush, Idaho fescue, Indian ricegrass, squirreltail grass, and big bluegrass. Most of the remainder of the WSA contains a salt desert shrub community which is characterized by greasewood, spiny hopsage, big sagebrush, rabbitbrush, shadscale, saltgrass, Great Basin wildrye grass, creeping wildrye grass, and Indian ricegrass. This community occurs throughout

Table 3. Classification of Energy and Mineral Potential, Sand Dunes WSA (OR-1-24)

Commodity	Area	Classification Level	Confidence Level
Evaporites (sodium, potassium)	Part of area (not shown on map)	2	B
	Rest of WSA	1	B
Metals (mercury, copper, silver, gold)	Part of area (not shown on map)	2	B
	Rest of WSA	1	A
Geothermal	Entire WSA	3	B
Uranium/Thorium	Entire WSA	1	A
Coal	Entire WSA	2	B
Oil and gas	Entire WSA	3	B
Limestone	Entire WSA	2	B
Bentonite	Entire WSA	1	B
Diatomite	See map 4	3	B
	Rest of WSA	2	B
Zeolites	Entire WSA	2	B

Legend:
Class 1 - Lack of indications of favorability
Class 2 - Low favorability
Class 3 - Moderate favorability
Class 4 - High favorability

Confidence Level A - Insufficient data or no direct evidence
Confidence Level B - Indirect evidence available
Confidence Level C - Direct evidence but quantitatively minimal
Confidence Level D - Abundant direct and indirect evidence

the sand dunes area except on the large moving sand dunes where little or no vegetation grows.

The ponderosa pine community is in a near-climax condition, with the sand dune communities in a midto late-seral stage. (Seral refers to a stage of ecological condition based on the difference between the present plant community and climax vegetation, the relatively stable, final stage in plant succession.)

Wildlife

The WSA supports few big game mammals, but supports a variety of nongame mammals in the different ecosystems within its boundaries. Black-tail and mountain jackrabbit, pigmy rabbits, least and yellow pine chipmunks, Townsend and golden-mantled ground squirrels, deer mice, pocket mice and northern grasshopper mice occur in the various parts of the WSA. Coyotes are common in the area and badger occur in lesser numbers. Bobcat and mountain lion are occasionally reported around the area.

Bird species are widely varied and include horned larks, sparrows, blackbirds, sapsuckers and common flicker, mountain bluebird and larger and more prominent species such as redtail hawk, prairie falcon and golden eagle. A number of reptiles occur in the area.

Livestock Grazing

The WSA is entirely within the Viewpoint grazing allotment. Table 4 shows existing livestock use in AUMs (animal unit months, the amount of forage needed to sustain one cow and calf, or equivalent animals, for one month).

The character of the sand dunes generally precludes any opportunity for range improvements. The only existing livestock improvement projects in the WSA (among the man-made features mentioned in the Naturalness section) are approximately 3 miles of fence and an old well not currently used.

The grazing operator currently uses vehicles (on the ways) and horses for livestock management. Vehicle use for grazing management is mostly around the perimeter of the WSA. An allotment management plan is being written for this area.

Cultural and Paleontological Resources

The WSA has numerous cultural and paleontological sites. It contains one of the few areas where the prehistoric inhabitants can be associated with now extinct animals. One early-man site, where the prehistoric inhabitant can be associated with the remains of a camel, has been located in the area.

These sites are scattered throughout the area, most often appearing between the sand dunes, eroding out of the old lake sediments. The few springs found in the area were a major focal point of occupation. The early-man sites have been dated to a period some 8,500 years ago, and artifacts and site types found throughout the area indicate occupation from this period to historic times.

The area is unique in the archeologic record of Lake County and the Northern Great Basin.

Recreation Use

The most intensive vehicle-oriented recreation in the area is ORV play. The WSA is close to the Christmas Valley community and many local residents regularly use the area for ORV recreation. The area also is used by recreationists from throughout the state. Memorial Day weekend usually accounts for high ORV use.

The sand dunes are a unique feature for ORV users within BLM's Lakeview District. The Alvord desert some 80 miles to the east receives ORV use, but the terrain is somewhat different; it contains broad alkali flats and vegetated low dunes. The coastal sand dunes some 200 miles to the west are similar in terrain, but the central location of the Fossil Lake Dunes and comparatively low use make it a unique recreation opportunity. Other recreation activities in the area are sightseeing by vehicle, some minor hunting use and hang gliding.

Table 4. Existing Livestock Use, Sand Dunes WSA (OR-1-24)

Grazing Allotment	Licensed AUMs in Allot.	Period of Use	Percent of Allot. in WSA	Current Actual Use in WSA (AUMs)
Viewpoint No. (103)	29,169	3/01-6/01	34	354

Economic Value and Local Income

Livestock grazing and recreation are the only resource outputs which generate economic activity in this WSA. The WSA currently produces 354 animal unit months (AUMs) of livestock forage and an unknown amount of recreation activity annually. As of January 1, 1984, there were no oil and gas or geothermal leases on the WSA.

The economic value of existing outputs amounts to $2,669 annually, and local personal income generated by existing outputs amounts to $3,635 annually. The terms economic value and local personal income are discussed in the Statewide EIS volume.

Environmental Consequences

This section discusses the environmental consequences of implementing each of the alternatives. Resources and activities not significantly affected by any of the alternatives are not discussed. General impact conclusions applicable to all WSAs, including impact conclusions based on speculative future developments (developments which are possible, but are not currently proposed), are discussed in the Statewide EIS volume. That volume also discusses certain assumptions that were made for this analysis.

Effects on Wilderness Values

The **all wilderness alternative** would add 16,000 acres to the National Wilderness Preservation System (NWPS). The unique paleontological, cultural and natural features of the sand dunes would be protected under wilderness designation. The unique interrelationship of the sand dunes with the Lost Forest would also be represented and preserved in this alternative. The natural condition of the area would be maintained and existing signs of man's activities would be masked or disappear in time.

Opportunities for solitude and primitive recreation inside the area would be enhanced by prohibiting vehicles from the area.

Under the **no wilderness/no action alternative,** some 10,000 acres of open sand dunes would remain open to use by ORVs. The vehicle use would have an adverse effect on the primitive recreation experience and solitude in the area. Mineral development would be possible under this alternative, except for development of locatable minerals on the 960 acres within the RNA. Any mineral development could adversely affect wilderness values, including the area's special wilderness features and opportunities for solitude and primitive recreation.

Effects on Energy and Mineral Development

The Sand Dunes WSA would be withdrawn from mineral exploration and development under the **all wilderness alternative.** This withdrawal would include the areas rated moderate for geothermal and oil and gas, which encompass the entire WSA, and the 12,930 acres rated moderate for diatomite. Locatable minerals have already been withdrawn from mineral entry on 960 acres.

No additional acreage would be withdrawn under the **no wilderness/no action alternative;** 960 acres in the RNA would continue to be withdrawn from mineral location.

Effects on Vegetation

Areas designated wilderness would not be subject to most surface disturbing activities. Vegetation dependent on the existing undeveloped environment would thus be maintained under the **all wilderness alternative.**

Under the all wilderness alternative, vegetation could stabilize some of the smaller dunes and deflation areas (sources of wind-blown sand). The trails could revegetate in the grassy meadow areas on the north side of the area as a result of excluding vehicles from the area. The extent to which vegetation would stabilize the dunes cannot be estimated because of the lack of base line data.

The **no wilderness/no action alternative** would result in continued impacts to vegetation from vehicles.

Effects on Livestock Grazing

The **all wilderness alternative** would have very little effect on livestock grazing in the WSA, as use is currently light and no projects are proposed in the area. The effect on livestock management would be slight because use of vehicles by livestock operators is limited in this area.

Under the **no wilderness/no action alternative,** there would be no impact on existing livestock operations.

Effects on Recreation Use

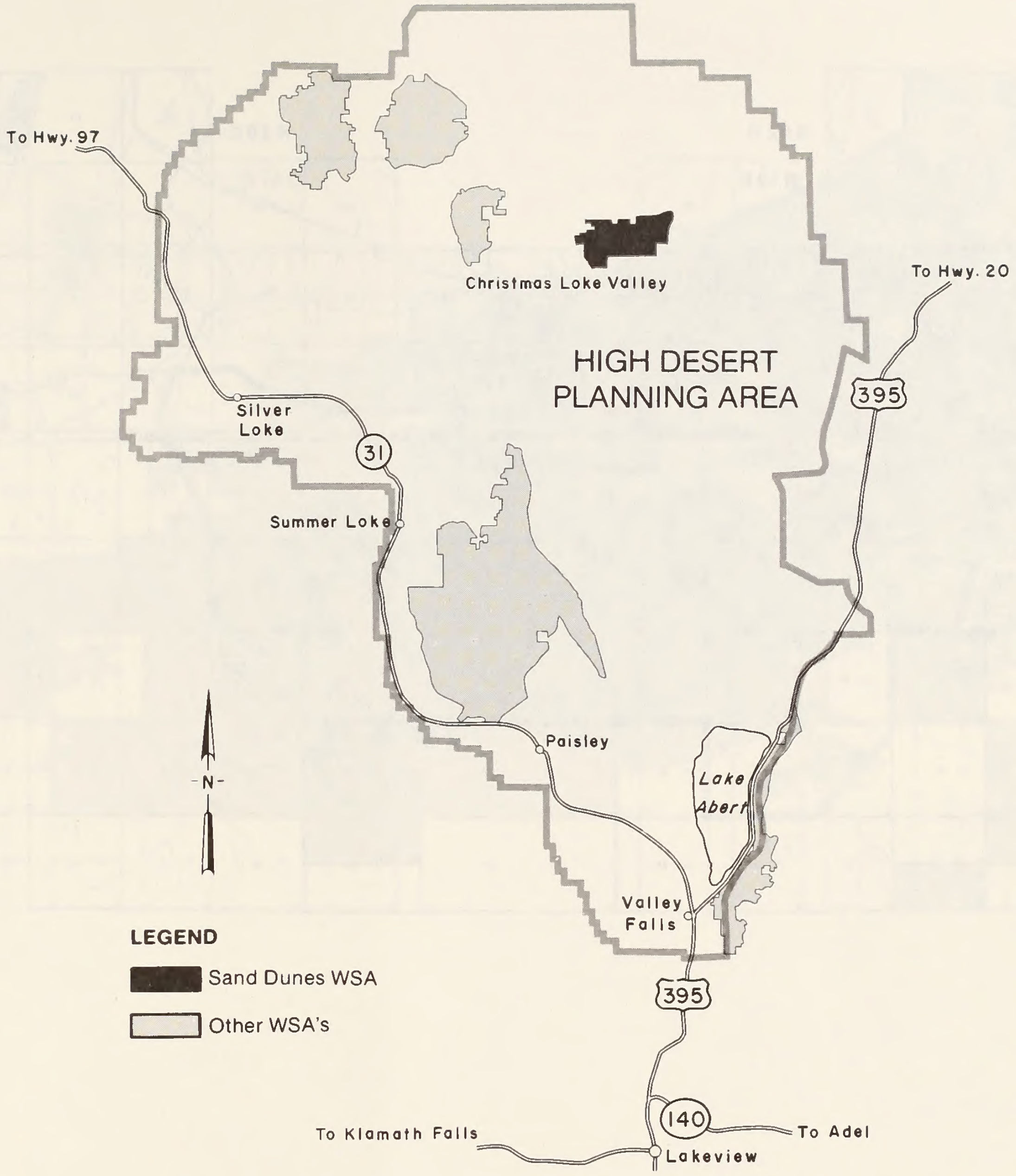
The **all wilderness alternative** would have a substantial impact on the ORV activity in the area. The several thousand visitor days of current use would be displaced permanently. As the sand dunes provide a unique type of experience with no other suitable sites in the same region (within 100 miles), this activity would be eliminated. This alternative would not significantly affect recreation activities in either the Lost Forest portion of the WSA nor the Fossil Lake area, as these areas already have restrictions similar to those under wilderness designation. There would be a substantial net reduction in overall recreation use in the WSA under this alternative.

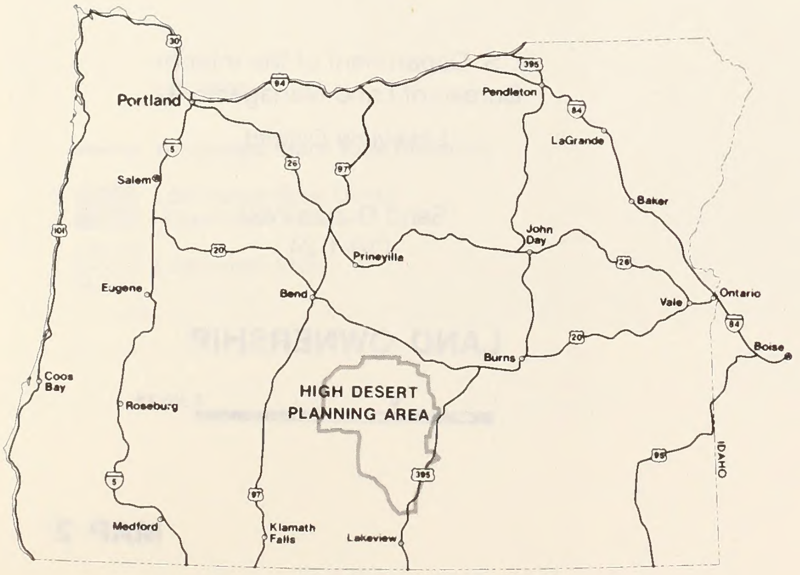
The **no wilderness/no action alternative** would allow continuation of vehicle-oriented recreation. Management of the ACEC embracing the area, however, could still lead to further restriction on ORV use if resource damage occurs. It is not a part of the ACEC plan, however, to totally close the area to ORVs. Overall recreation use would continue at or near present levels.

Effects on Economic Value and Local Income

There would be unknown losses in economic value and local personal income, under the **all wilderness alternative,** as a result of reduced recreation use.

There would be no impacts under the **no wilderness/no action alternative.**





U. S. Department of the Interior
Bureau of Land Management

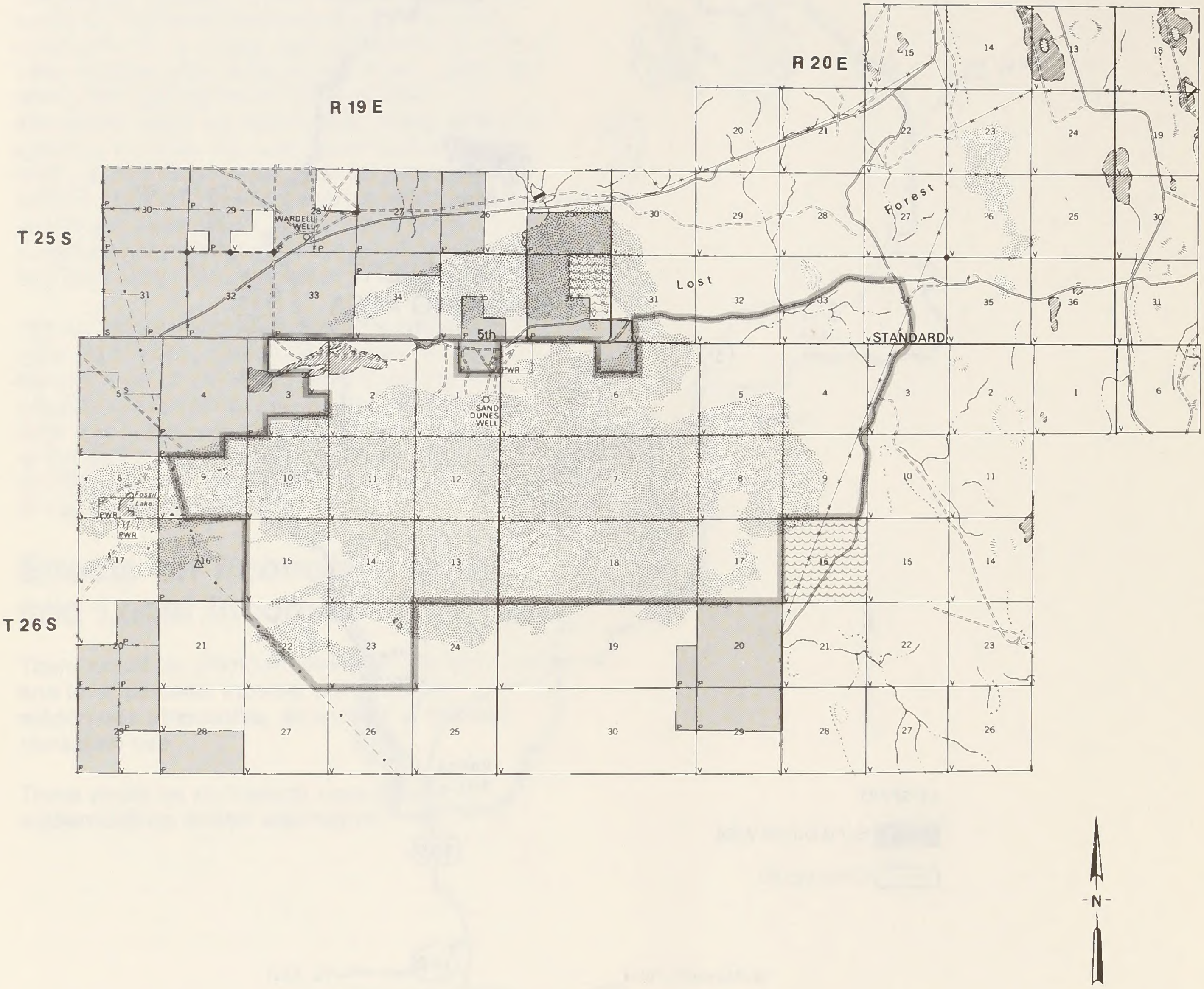
Lakeview District

Sand Dunes WSA
OR-1-24

LOCATION MAP

10 0 10 MILES

MAP 1



LEGEND

- ▬ Wilderness Study Area Boundary
- ☐ Bureau of Land Management
- ▨ Private
- ▤ BLM Surface-State or Private Subsurface (Split Estate)
- ▒ Sand Dunes

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Sand Dunes WSA
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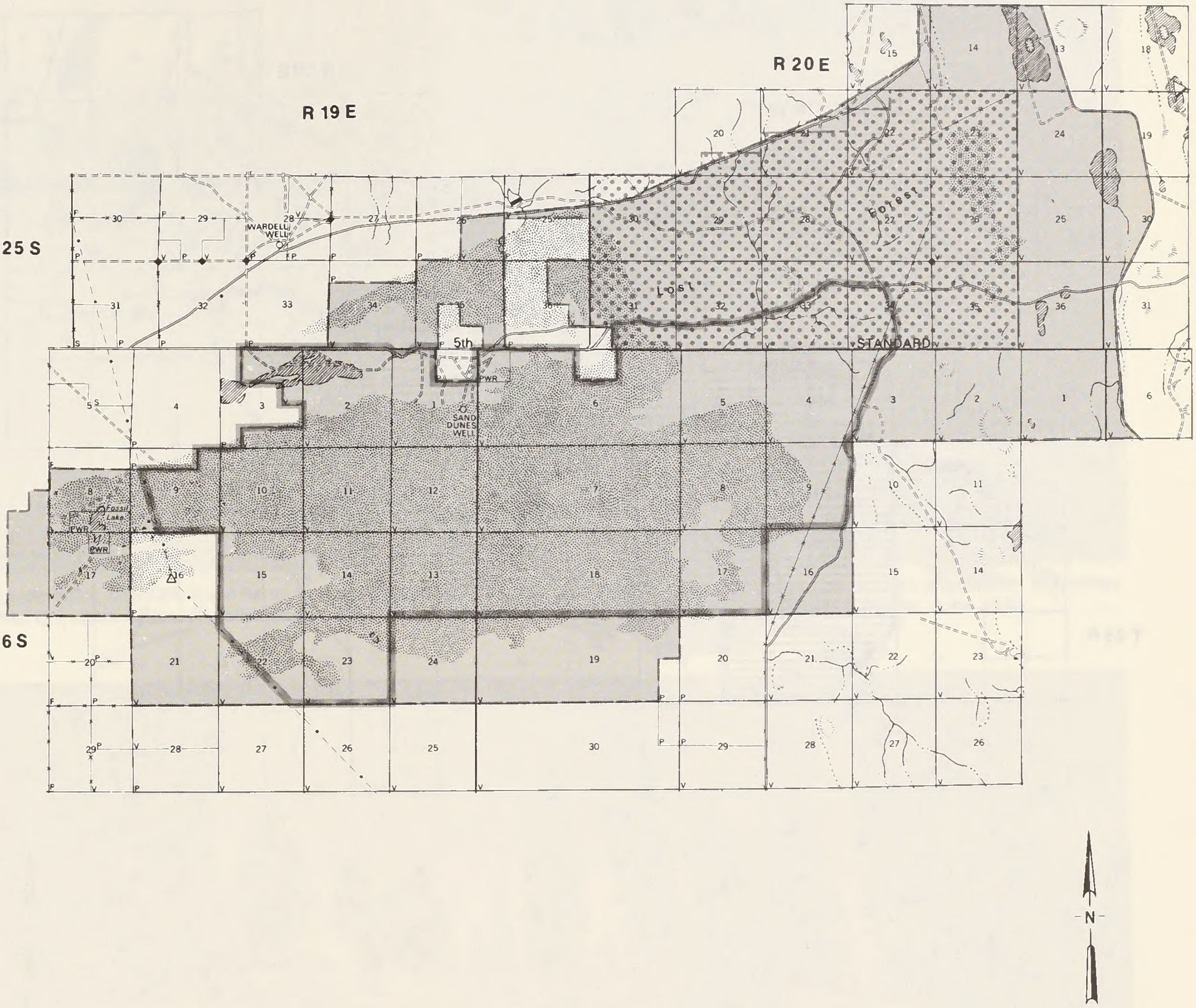
LAND OWNERSHIP

1 0 1 2 MILES

MAP 2



LEGEND

- ▬ Wilderness Study Area Boundary
- ▨ Lost Forest-Sand Dunes -Fossil Lake ACEC
- ⁘ Lost Forest RNA

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Lakeview District

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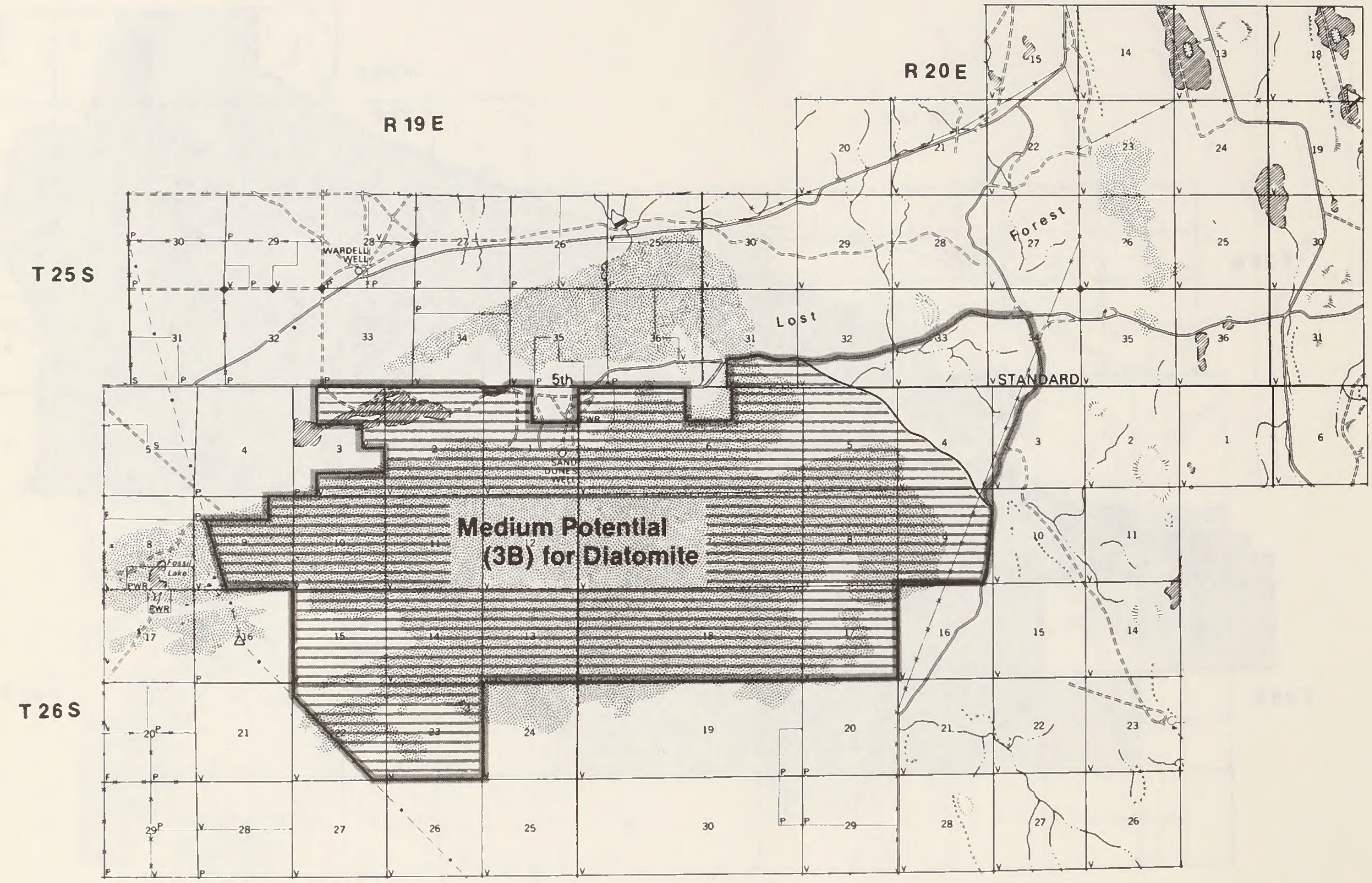
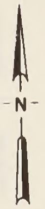
AREA OF CRITICAL ENVIRONMENTAL CONCERN & RESEARCH NATURAL AREA

1 0 1 2 MILES

MAP 3





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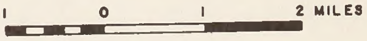
Sand Dunes WSA
OR-1-24

MEDIUM OR HIGH POTENTIAL MINERAL OR ENERGY RESOURCES



Entire WSA:
Medium Potential
(3B) for Geothermal Resources and
for Oil and Gas

MAP 4

Sand Dunes WSA, OR-1-24. Near Sand Dunes Well looking south into the sand dunes. Recommended nonsuitable under the preferred (no wilderness/no action) alternative. Illustrates sparse vegetation between sand dunes. June 1982.

Sand Dunes WSA, OR-1-24. In Lost Forest portion of the WSA. Within area recommended nonsuitable under the preferred (no wilderness/no action) alternative. Illustrates ponderosa pine and juniper cover in the northern portion of the WSA. July 1982.

Appendix to the Wilderness Environmental Impact Statement for Oregon

Diablo Mountain Wilderness Study Area (OR-1-58)

General Description of the Study Area

The Diablo Mountain wilderness study area (WSA) is located in Lake County, Oregon, approximately 110 miles southeast of Bend, Oregon (see map 1). The area can be reached by short approaches on county roads from Oregon State Highway 31. The south end of the WSA is five miles northwest of the small town of Paisley.

The WSA contains 107,920 acres of public land (see map 2). In addition, there are 640 acres of state land, 1,170 acres of private land, and 4,120 acres of split-estate land (federally managed surface, state or privately owned subsurface mineral rights) inside the WSA. The study area is approximately 24 miles from north to south and 15 miles wide. There is one narrow spur four miles long and two miles wide on the east side of the area.

The boundaries of the area are defined by the medial line of Summer Lake on most of the west side of the WSA, private lands on part of the south and north sides, BLM roads on the east and south, and by the boundary of the Summer Lake State Game Management area on the northwest. Several parcels of private land project into the north-central part of the area and are almost surrounded by the WSA.

The west half of the WSA has low rolling terrain and salt flats adjacent to Summer Lake. The east half of the WSA contains several long north to south ridges rising to the summit ridge of Diablo Mountain. The east edge of the WSA is the steep scarp of Diablo, dropping some 1,500 to 2,000 feet to the lands to the east. The WSA is comprised of salt flats on the far west, salt desert shrub communities in the central portion and sagebrush/grasslands in the higher elevations on the east.

Interrelationships

The Oregon State Game Management Area adjacent to the WSA on the northwest is heavily used during bird hunting season.

The extreme eastern edge of the WSA is in the Paisley Desert wild horse herd management area (HMA). HMA management will not be significantly affected by any of the alternatives.

Issues

Issues relating to each WSA were raised by BLM and the public during the wilderness inventory and EIS planning and scoping process. These issues concern both the effects of wilderness designation on existing and potential land uses or resources in the WSA, as well as the effects of existing and potential land uses or resources on wilderness values. Land uses or resources raised as issues specifically for this WSA include:

- the presence of private inholdings and adjacent private parcels (the effects of wilderness designation on private lands are addressed in Statewide EIS volume);
- management of wild horses (addressed in Statewide EIS volume); and
- archeological and wildlife resources in the northwest portion of the WSA. (The archeological issue is addressed in the Statewide EIS volume.)

Also raised as an issue was the manageability of the area as wilderness with the split-estate lands inside the boundaries.

Description of the Alternatives

The following alternatives are analyzed:

- all wilderness
- enhanced wilderness
- partial (preferred alternative)
- no wilderness/no action

All Wilderness

Under the all wilderness alternative, all 107,920 acres of public land in the Diablo Mountain WSA would be recommended suitable for wilderness designation (see map 2). For purposes of analysis, it is assumed that the private and split-estate inholdings would not be acquired.

Enhanced Wilderness

The enhanced alternative would recommend all 107,920 acres of public land suitable as wilderness (see map 3). Also, an attempt would be made to acquire the 5,400 acres of private, state, and split-estate inholdings, as well as two parcels of split-estate totaling 1,080 acres bordering the WSA. These parcels could be acquired through purchase or exchange with willing landowners and involve 640 acres of state land, 640 acres of private land and 5,200 acres of split-estate land, for a total of 6,480 acres, to be acquired under this alternative.

Assuming acquisition of these lands, total area recommended suitable under this alternative would be 114,400 acres.

Partial (Preferred Alternative)

Under the partial alternative, 47,480 acres of the WSA would be recommended suitable as wilderness (see map 4). Also, an attempt would be made to acquire 3,680 acres of split-estate lands within the WSA through purchase or exchange with willing landowners. There are no private inholdings in the area that would be recommended as suitable for wilderness.

Assuming acquisition of the split-estate lands, total area recommended suitable under this alternative would be 51,160 acres.

Some 60,440 acres would be recommended as nonsuitable. Included among the nonsuitable portion would be most of the lands in the WSA with the highest potential for mineral and geothermal development.

The partial alternative would place the west boundary of the area recommended suitable along a way (a vehicle route established and maintained solely by the passage of vehicles), running from the Foster Ranch on the north to the Five Mile Butte area on the south. The way is used for management of livestock and would serve as a physical, easily identifiable boundary for the west side of the wilderness area.

The boundary would also exclude from the suitable area a small amount of public land near the Foster Ranch in the northwest part of the WSA. It would align the boundary along section lines rather than the somewhat irregular private ownership lines.

No Wilderness/No Action

The no wilderness/no action alternative would recommend the entire WSA nonsuitable as wilderness. It represents the situation most likely to occur without wilderness designation. The area would be managed according to the current land use plan, which includes continued availability for mineral exploration and development.

Table 1 summarizes the proposed management of the WSA under each alternative.

Table 2 summarizes the environmental consequences of each alternative.

Manageability of the Area as Wilderness

The areas recommended as suitable in the all wilderness, enhanced wilderness and partial alternatives would be manageable as wilderness, although development of minerals in the inholdings could present minor problems. The enhanced wilderness and partial alternatives would improve

Table 1. Summary of Proposed Management Under Each Alternative, Diablo Mountain WSA (OR-1-58)

Proposed Management	All Wilderness	Enhanced Wilderness	Partial	No Wilderness/ No Action
Acres Designated as Wilderness	107,920	107,920	47,480	0
Acres Closed to ORVs by Wilderness Designation	107,920	107,920	47,480	0
Miles of Ways Closed	32	32	18	0
Acres of Full Fee Estate Acquired[1]	0	1,280	0	0
Acres of Split Estate Acquired [1]	0	5,200	3,680	0
Acres Withdrawn from Mineral Location and Leasing	107,920	107,920	47,480	0

[1] Upon acquisition, these additional lands would be incorporated into the wilderness area, closed to vehicle use, and withdrawn from mineral location and leasing.

ability to manage the area as wilderness by eliminating any possible land use conflicts within the area.

Rationale for the Selection of the Preferred Alternative

The partial alternative is preferred because it would preserve the portion of the WSA with the most wilderness values, and it would allow mineral exploration and development on most of the lands with mineral potential. This alternative would allow unrestricted use of vehicles for livestock management in most of the area where such use now occurs, and it would eliminate most of the potential conflict between wilderness management and private use or development of inholdings.

Affected Environment

This section discusses only those activities or resources that influence the character of the study area, or that may be affected by the alternatives.

Wilderness Values

Naturalness

The Diablo Mountain WSA is primarily in a natural condition. The broad flats along Summer Lake, low dune areas in the lowlands and the draws and ridges of the eastern portion of the area bear only a few minor signs of man's recent activities. Natural processes have masked or removed signs of past activities, such as travel routes, range developments or other structures.

The area contains seven scattered livestock waterholes. These developments are dwarfed by the large size of the WSA and the topography screens them from view outside of their immediate location.

There are some 32 miles of vehicle ways inside the WSA. Approximately 7 miles of these ways are well used and distinct. The remaining 25 miles are barely used, if at all, and in some cases are difficult to find. The overall effect of these ways on the area's naturalness is negligible.

Approximately 5,000 acres south of Sharp Top peak in the eastern spur of the WSA burned in August of 1983. As part of the rehabilitation of the burned area, ryegrass was aerially seeded on about 1,000 acres inside the WSA to stabilize soils extremely prone to erosion. With regrowth of natural vegetation, the rye should be displaced in a short time (3 to 5 years) and become unnoticeable. About 8 miles of fence were also constructed on the south portion of the WSA to exclude cattle during the recovery period.

The rehabilitation project had no significant impact to wilderness resources in the WSA.

Overall, man-made developments inside the WSA influence about 1 percent of the area. (The area of influence is an estimate of the acreage within the WSA from which the man-made developments can be seen.)

Due to the large size of the WSA, developments outside the area do not affect a visitor's perception of the area's naturalness.

Opportunities for Solitude or Primitive and Unconfined Types of Recreation

The large size and topography of the WSA provide outstanding opportunities for solitude at all locations, except the mile or two where the southern boundary runs along Highway 31. The draws and ridges along the east side from Sharp Top to the peak of Diablo are particularly remote and assure outstanding opportunities for solitude.

Activities outside the WSA do not substantially affect opportunities for solitude in most of the WSA. Activities at Summer Lake Hot Springs, at a gravel quarry east of the springs, and on ranches adjacent to State Highway 31 have a minor adverse effect on opportunities for solitude in the southwest corner of the WSA. The sights and sounds of hunting in the state game management area during the fall

Table 2. Summary of Environmental Consequences of Alternatives, Diablo Mountain WSA (OR-1-58)

Resource or Activity	All Wilderness	Enhanced Wilderness	Partial (Preferred Alternative)	No Wilderness/No Action
Wilderness Values	Would add 107,920 acres to the NWPS. Preserve wilderness values in east half of Summer Lake, alkali flats, sand dunes, low hills, and Diablo Mountain. Closure of 32 miles of ways would enhance wilderness values. Energy and mineral development on inholdings could adversely affect wilderness qualities in surrounding wilderness area. Area would be manageable as wilderness.	Would add 114,400 acres to NWPS, assuming acquisition of 6,480 acres of private and split-estate land. Effects similar to all wilderness except that acquisition of inholdings would preclude possible adverse effects from energy and mineral development on inholdings; manageability improved. Closure of 32 mile of ways would enhance wilderness values.	Would add 51,000 acres to the NWPS, assuming acquisition of 3,680 acres of split-estate land. Preserve wilderness values in salt-brush flats, rolling hills, and Diablo Mountain. Closure of 18 miles of ways would enhance wilderness values. Energy and mineral development in Summer Lake, alkalai flats, and sand dunes in the nonsuitable portion could adversely affect wilderness values in that portion of WSA and in the part of the wilderness in which the development could be seen and heard.	Wilderness values in entire WSA subject to adverse effects from conflicting resource uses, including energy and mineral development.
Energy and Mineral Development	Development precluded on 107,920 acres including 25,240 acres with moderate potential for sodium, potassium, lithium, borates; 1,440 acres with high potential for limestone; 66,680 acres with moderate potential for limestone and diatomite; 250 acres with high geothermal potential; 68,120 acres with moderate geothermal and oil and gas potential.	Effects similar to all wilderness, except that development also precluded on 6,480 acres of private and split-estate land if acquired.	Development precluded on 47,480 acres, plus an additional 3,680 acres split-estate land if acquired, including 1,390 acres with high potential for limestone; 13,970 acres moderate potential for limestone and diatomite; and 26,880 acres with moderate geothermal and oil and gas potential.	No impact.
Livestock Grazing	Possible restrictions on use of vehicles for livestock management.	Same as all wilderness.	Possible restrictions on use of vehicles in suitable portion; no restrictions in nonsuitable portion.	No impact.
Recreation Use	Limited amount of recreation involving use of vehicles in the area would be precluded. Amount of primitive recreation activity would equal amount of displaced vehicle-oriented recreation. No change in overall use.	Same as all wilderness	Effect on vehicle-oriented recreation similar to all wilderness because suitable portion is not well suited to use of vehicles. No change in overall use.	No impact on vehicle-oriented recreation. No change in overall use.
Economic Value and Local Income	Decrease in economic value and local personal income by $620 and $96 respectively, from loss of oil and gas leases. The maximum increases in transportation costs to livestock operators with grazing permits would be $300.	Same as all wilderness.	Same as all wilderness.	No change.

hunting season have a small adverse effect on opportunities for solitude in a small portion of the northwest corner of the WSA.

Outstanding recreation opportunities for hiking and backpacking occur along the eastern half of the WSA, in the draws and mountain areas. Good recreation opportunities are also available in the sand hills and flats on the west side of the WSA. There is some potential for wildlife observation in the WSA; wild horses are found in the eastern edge of the area.

Special Features

The east slope of Diablo Mountain is one of a series of steep fault scarps which formed the basin and range topography of much of southeastern Oregon.

Fossil mollusks have been found in sedimentary deposits around the Ten Mile Butte area, and there probably are more fossils in the sedimentary rocks in the western two-thirds of the WSA.

The area is one of several being considered by the Oregon Department of Fish and Wildlife for reintroduction of bighorn sheep.

The rims on the east side of the WSA are used by raptors.

Diversity in the National Wilderness Preservation System (NWPS)

According to the Bailey-Küchler system of classifying ecosystems, the WSA is in the Intermountain Sagebrush Province and the potential natural vegetation is saltbush-greasewood and sagebrush steppe. The study area contains seven vegetative communities listed in the Basin and Range section of the Oregon Natural Heritage Plan: big sagebrush/bluebunch wheatgrass; big sagebrush- greasewood; low sagebrush/Sandberg's bluegrass; bare playa and playa margin; big sagebrush-spiny hopsage; greasewood-saltgrass and shadscale-spiny hopsage-bud sage.

The WSA is within 5 hours' driving time of four standard metropolitan statistical areas with population over 100,000: Medford, Salem, and Eugene/Springfield, Oregon.

Energy and Mineral Development

Energy and mineral resources were evaluated by BLM using available geologic data and data provided in a report titled "Assessment of Geology, Energy, and Minerals Resources of the Summer Lake Geologic Resource Area" prepared by TERRADATA, a consulting firm under contract with BLM. The WSA is within the Summer Lake geologic resource area which has been classified according to a rating system that indicates both the potential for occurrence (geologic favorability) of certain minerals, as well as the quantity and quality of data on which the rating is based (confidence level). A description of the rating system is provided in the Statewide EIS volume.

The main potential energy resources in the WSA appear to be geothermal resources and oil and gas.

The southern end of the study area (250 acres) is within the Summer Lake Known Geothermal Resource Area (KGRA, a federally defined area with specific boundaries within which geothermal resources are known to exist). The favorability for occurrence of geothermal energy is rated high for this portion of the WSA. The western two-thirds of the WSA is rated moderately favorable for geothermal energy.

Because of the possibility of oil and gas bearing rocks at depth, and some gas shows in water wells, there also appears to be moderate favorability for oil and gas in the western two-thirds of the WSA.

The portion of the WSA in and immediately adjacent to the Summer Lake lakebed is rated moderately favorable for the occurrence of sodium, potassium, lithium, and borates. About 1,440 acres around the Ten Mile Butte area are rated as having a high favorability for the occurrence of limestone. However, the limestone in this area is a lacustrine (lake) deposit contaminated with clay, sand, and organic material. The western two-thirds of the WSA is rated as moderately favorable for limestone and diatomite.

Table 3 gives the mineral potential classifications in the WSA. Map 5 shows the portions of the WSA rated moderate (medium) for evaporites, oil and gas, and diatomite, and the portions rated high and moderate for geothermal resources and limestone.

The only known mineral deposits within the WSA are rock aggregate sites (for road construction) at the south end of the WSA, and a low-grade limestone deposit near Ten Mile Butte.

As of January 1, 1984, there was one oil and gas lease covering 320 acres and no mining claims or geothermal leases in the WSA.

Table 3. Classification of Energy and Mineral Potential, Diablo Mountain WSA (OR-1-58)

Commodity	Area	Classification Level	Confidence Level
Evaporites (sodium, potassium, lithium, borates)	See map 5	3	B
	Rest of WSA	1	B
Metals (mercury, gold)	Entire WSA	2	B
Geothermal	See map 5	4	D
	See map 5	3	C
	Rest of WSA	2	A
Uranium/thorium	Entire WSA	1	A
Coal	Entire WSA	2	B
Oil/Gas	See map 5	3	B
	Rest of WSA	2	A
Limestone	See map 5	4	D
	See map 5	3	B
	Rest of WSA	1	C
Bentonite	Entire WSA	2	C
Diatomite	See map 5	3	C
	Rest of WSA	1	B
Zeolites	Entire WSA	1	C

Legend:

Class 1 - Lack of indications of favorability
Class 2 - Low favorability
Class 3 - Moderate favorability
Class 4 - High favorability

Confidence Level A - Insufficient data or no direct evidence
Confidence Level B - Indirect evidence available
Confidence Level C - Direct evidence but quantitatively minimal
Confidence Level D - Abundant direct and indirect evidence

The surface of the WSA is characterized by Tertiary continental volcanic rocks and volcanic-related sediments, and Tertiary to Quaternary lacustrine (lake), fluvial (stream), and eolian (wind-blown) sedimentary deposits. Geology of the subsurface is largely unknown, but pre-Tertiary marine sedimentary rocks may exist at depth.

Vegetation

The Summer Lake Basin vegetation, on the west side of the WSA, is typical salt-desert shrub communities of mainly black greasewood with spiny hopsage, shadscale, budsage, spiny horsebrush and some big sagebrush and gray rabbitbrush. Great Basin wildrye, Indian ricegrass, and squirreltail occur on the sand dunes and hummocks. Desert saltgrass occurs throughout the basin, becoming quite abundant in the area surrounding barren playas and where alkali is heavy.

Wildflowers are common in the salt-desert shrub community. Smooth malocothrix and desert paintbrush commonly occur and add vivid yellow and red colors to the understory. Other wildflowers are: eriastrum, hairy evening-primrose, carved-seed, plagiobothrys, thelypody, showy townsendia, cushion buckwheat and milk-vetch.

Vegetation on the uplands to the east of the basin is different than what would be normally expected. Blowing alkali sands over the centuries have influenced the soils and vegetation in the surrounding uplands. Salt-desert shrub communities, which are generally restricted to basins, occur throughout the Diablo WSA, wherever the prevailing winds have carried the alkali dust and sand to be deposited.

The salt-desert shrub community (greasewood, spiny hopsage, shadscale, budsage, and horsebrush) forms mosaic patterns with big sagebrush and cheatgrass communities throughout the uplands of the WSA. The differences in size, color, and species, and the dominance of shrubs, form the basis of the mosaic pattern and give subtle texture to the landscape. Transition areas from the basin to the uplands are noticeable along the north slope of the WSA.

The typical salt-desert shrub community can be observed grading into greasewood-big sagebrush/cheatgrass with some spiny hopsage and shadscale to big sagebrush/cheatgrass to shadscale/*poa* communities.

Wildflowers on the uplands are not numerous but include cushion buckwheat, desert paintbrush, death-camas and larkspur.

The salt-desert shrub community in the basin is in good condition and is an excellent representative of this major community type. This same community in the uplands is quite unusual and shows the long term influence of the drying of Summer Lake and its effect on the surrounding area. The plant communities in the area are generally in mid-seral stage. (Seral refers to a stage of ecological condition based on the difference between the present plant community and climax vegetation, the relatively stable, final stage in plant succession.)

Wildlife

A variety of animals inhabit or frequent the WSA. The area has some antelope, deer, coyotes, rabbits and other small animals. Because of the lack of water, habitat is somewhat limited for most species.

The rims on the east side of the WSA are used by raptors and numerous bird species pass through the area. Reptiles in the area include various lizards and snakes. Diablo is one of several areas being considered by the Oregon Department of Fish and Wildlife (ODFW) for potential reintroduction of bighorn sheep.

Livestock Grazing

The WSA contains portions of five grazing allotments. These allotments were recently segregated from one single allotment originally known as the Paisley Common. Table 4 summarizes existing livestock use in the study area in AUMs (animal unit months, the amount of forage needed to sustain one cow and a calf, or equivalent animals, for one month).

Existing livestock projects in the WSA (among the man-made developments mentioned in the

Table 4. Existing Livestock Use, Diablo Mountain WSA (OR-1-58)

Grazing Allotment	Licensed AUMs in Allot.	Period of Use	Percent of Allot. in WSA	Current Actual Use in WSA (AUMs)
Paisley Common (No. 400)	149	03/1-06/15	45	15
St. Patricks (No. 419)	1,680	03/1-07/30	4	67
Rosebud (No. 421)	158	11/1-12/30	45	71
Five Mile Butte (No. 426)	525	03/1-06/15 and 11/1-01/30	52	278
Sheep Rock (No. 428)	4,000	03/1-06/15	6	40
Total	6,512			471

Naturalness section) include 7 waterholes and 4 miles of temporary fence in the southeast corner of the WSA. The fence excludes cattle from the Sharp Top fire rehabilitation area.

No livestock improvement projects are proposed in the WSA. As a result of the Sharp Top fire rehabilitation and burn, some temporary increase in AUMs may result from increases in native forage inside the WSA. The increase would be temporary because it is likely that forage production would decline as sagebrush reinvaded the area.

Current livestock management involves a minor amount of vehicle use inside the WSA on existing ways.

Recreation Use

The primary vehicle-oriented recreation activity in the WSA is related to hunting and, to a limited extent, off-road-vehicle use near the east side of Summer Lake on the playa. Vehicle-oriented recreation occurs throughout most of the year. Most primitive recreation use occurs in spring and fall. Trapping occurs in winter in the WSA but is limited to existing trails.

Evidence of recreation use, such as vehicle tracks and observed use, indicates rather low levels of vehicle-oriented recreation use. Primitive recreation is also fairly limited in the WSA. Correspondence received by BLM's Lakeview District indicates the area is used for camping and backpacking, mostly on the east side and north end of the WSA.

Economic Value and Local Income

Livestock grazing, oil and gas leasing, and recreation are the only resource outputs which generate economic activity in this WSA. The WSA currently produces 471 animal unit months (AUMs) of livestock forage, $320 of oil and gas lease fees, and an unknown amount of recreation activity annually. As of January 1, 1984, there were 320 acres of oil and gas leases and no geothermal leases on the WSA.

The economic value of existing outputs amounts to $3,871 ($3,551 from grazing and $320 from leases) annually, and local personal income generated by existing outputs amounts to $4,933 ($4,837 from grazing and $96 from leases) annually. The terms economic value and local personal income are discussed in the Statewide EIS volume.

Environmental Consequences

This section discusses the environmental consequences of implementing each of the alternatives. Resources and activities not significantly affected by any of the alternatives are not discussed. General impact conclusions applicable to all WSAs, including impact conclusions based on speculative future developments (developments which are possible, but are not currently proposed), are discussed in the Statewide EIS volume. That volume also discusses certain assumptions that were made for this analysis.

Effects on Wilderness Values

The **all wilderness alternative** would add 107,920 acres to the National Wilderness Preservation System (NWPS). It would preserve wilderness values in the eastern portion of the Summer Lake basin and accompanying alkali flats, rolling vegetated dunes, saltbrush flats blending to low hills, and the broken flanks of the Diablo Mountain uplift. It would also preserve the area's outstanding opportunities for solitude and scenic vistas of the Summer Lake basin, Winter Ridge and the high desert country to the east of the wilderness. Closure of the 32 miles of ways would increase the naturalness of the area and improve opportunities for solitude and primitive recreation.

Minerals and geothermal exploration and development activities could occur on the scattered inholdings of split-estate land. Development on the lands would require access for the site and associated pipelines.

Topography would limit the impacts of potential development to land around the inholdings. Due to the large size of the study area, such development would not be expected to influence the wilderness area as a whole. The impacts would be more noticeable in the west half of the area than in the more topographically broken eastern portions.

The **enhanced wilderness alternative** would add 114,400 acres to the NWPS, assuming the 6,480 acres of private and split-estate inholdings and adjacent parcels could be acquired.

Acquisition of inholdings would enhance the naturalness of the area by preventing development on these scattered parcels. Acquisition of inholdings would also assure preservation of opportunities for solitude and primitive recreation. Closure of 32 miles of ways would have the same effect on wilderness values as the all wilderness alternative.

The **partial alternative** would add 51,160 acres to the NWPS, assuming the 3,680 of split-estate land could be acquired. It would recommend as nonsuitable for wilderness 60,440 acres of land west of a vehicle way from Five Mile Butte on the south to the Foster Ranch on the north end of the WSA. It would preserve wilderness values in the area recommended suitable, including the saltbush flats between the way and the slopes of Diablo Mountain and all of the rugged terrain on the west face of Diablo, including the mountain itself. Approximately 18 miles of ways would be closed. The closures would enhance the wilderness values of the area.

Under the partial alternative, all of the nonsuitable lands in the WSA west of the way would be open to mineral development, including oil and gas and geothermal development. As a result, the development could be more extensive and could adversely affect more wilderness values than under the all wilderness alternative. Sights and sounds from developments west of the way could adversely affect wilderness values in the suitable area to the east to some degree, depending on location of the development.

Effects of the partial alternative in the suitable area would preserve wilderness values east of the way in the same manner as the enhanced wilderness alternative.

Under the **no wilderness/no action alternative,** wilderness values in the entire WSA would be subject to potential mineral development. There are no mineral exploration or development activities occurring in the area at present. In view of the area's energy and mineral potential, however, exploration and development could occur in the future, and such activities would adversely affect wilderness values.

Effects on Energy and Mineral Development

Areas designated wilderness would be withdrawn from mineral exploration and development. Table 5 shows the acres that would be withdrawn under each alternative, including the acres with moderate or high mineral potential.

Table 5. Effects of Alternatives on Energy and Mineral Development, Diablo Mountain WSA (OR-1-58)

	Acres Withdrawn			
	All Wilderness	Enhanced Wilderness	Partial	No Wilderness/ No Action
Total acres	107,920	107,920[1]	47,480[2]	0
Sodium, Potassium, Lithium, Borates rated moderate	25,240	25,240	0	0
Limestone rated high	1,440	1,440	1,390	0
Limestone rated moderate	66,680	66,680	13,970	0
Geothermal rated high	250	250	0	0
Geothermal rated moderate	68,120	68,120	26,880	0
Oil and gas rated moderate	68,120	68,120	26,880	0
Diatomite rated moderate	66,680	66,680	13,970	0

[1] Development also precluded on an additional 6,480 acres if private and split-estate land is acquired as proposed under this alternative.

[2] Development also precluded on an additional 3,680 acres if split-estate land is acquired as proposed under this alternative.

Effects on Livestock Grazing

Under the **all wilderness, enhanced wilderness,** and **partial alternatives,** vehicle access for livestock management would be precluded in the suitable portions, unless there were no practical alternative to using vehicles.

Under the no wilderness/no action alternative, there would be no restrictions on vehicle use.

Effects on Recreation Use

The **all wilderness** and **enhanced wilderness alternatives** would preclude vehicle use for recreation in the area. Vehicle-oriented recreation would decrease, but the change would not be substantial because only a small amount of such use occurs in the area. The key access for recreational trapping would still be available along the south boundary road of the area. Increases in primitive recreation would most likely equal the loss in vehicle-oriented recreation use. There would be no change in overall recreation use under these alternatives.

The **partial alternative** would allow the limited amount of off-road vehicle activity occurring around the lakeshore to continue. The portion of the WSA recommended as suitable for wilderness is not well suited topographically for this activity, so there would be no change. The west half of the WSA would be available for vehicle-oriented recreation under this alternative. There would be no change in overall recreation use.

Under the **no wilderness/no action alternative,** vehicle-oriented recreation activities in the WSA would not be limited. Present use would continue, with no change in overall recreation use.

Effects on Economic Value and Local Income

The economic effects for the alternatives are presented in tables 6 and 7. Table 6 shows the effects on economic value and table 7, the effects on local personal income.

Currently, there is little dependence on vehicles for livestock management in the study area. The wilderness alternatives would restrict such vehicle use unless there were no practical alternative. The maximum impact from road closures upon the grazing operator in the WSA would be an increase in cost of about $300 per year.

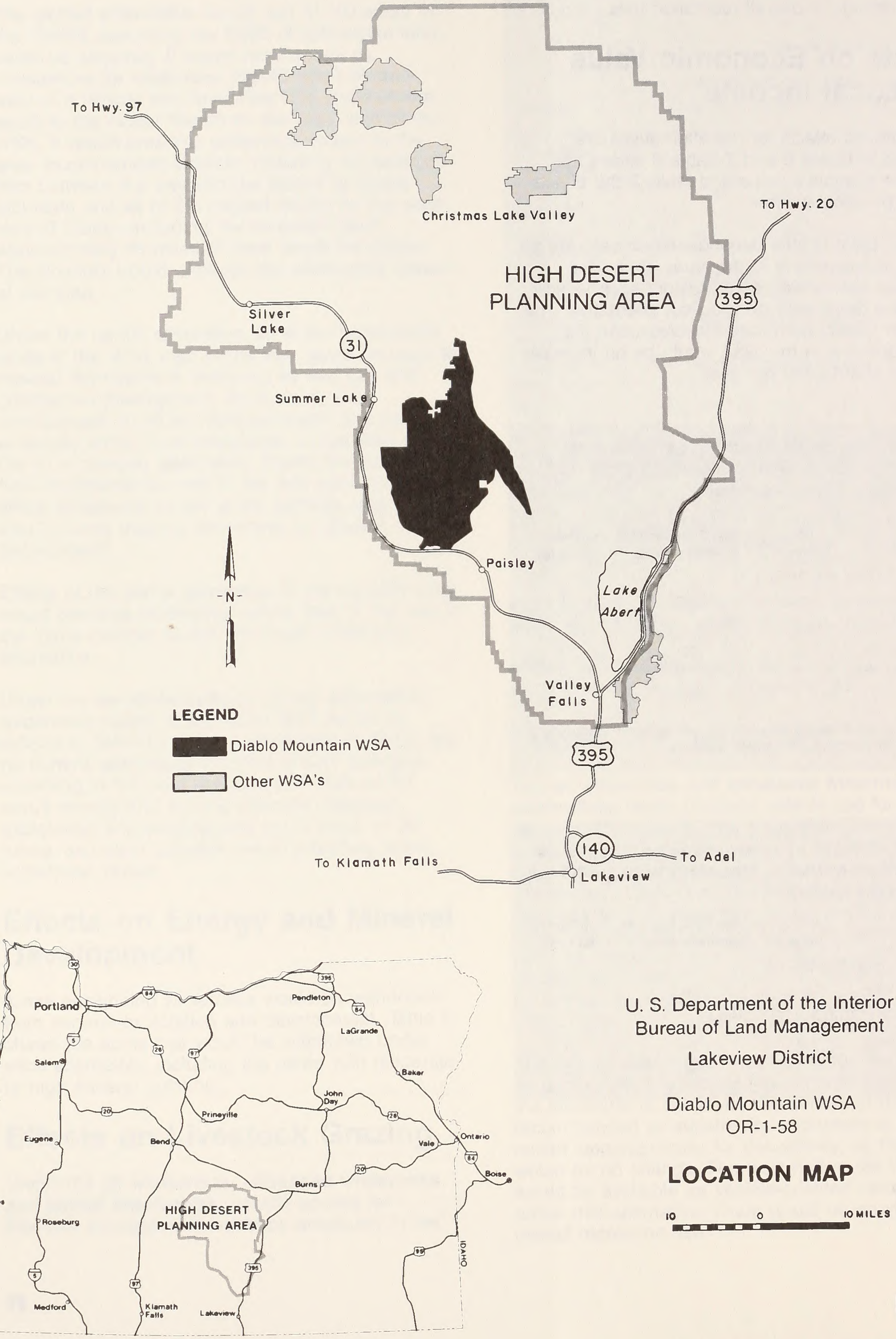
Table 6. Effects of Alternatives on Annual Economic Value, Diablo Mountain WSA (OR-1-58) (1981 price levels)

Item	Unit of Measure	All Wilderness, Enhanced Wilderness, Partial	No Wildernes/ No Action
CHANGES IN RESOURCE OUTPUTS			
Oil and Gas leases	Acres	-320	0
VALUE OF EXPECTED CHANGES IN OUTPUTS			
Reduced access[1]	$	-300	0
Oil and Gas leases	$	-320	0
Total	$	-620	0

[1] Additional cost (shown as negative value) due to restriction of vehicular access for livestock operator.

Table 7. Effects of Alternatives on Local Personal Income, Diablo Mountain WSA (OR-1-58) (1981 price levels)

Item	Unit of Measure	All Wilderness, Enhanced Wilderness, Partial	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS			
Oil and Gas leases	Acres	-320	0
INCOME FROM EXPECTED OUTPUT CHANGES			
Oil and Gas leases	$	-96	0
Total	$	-96	0



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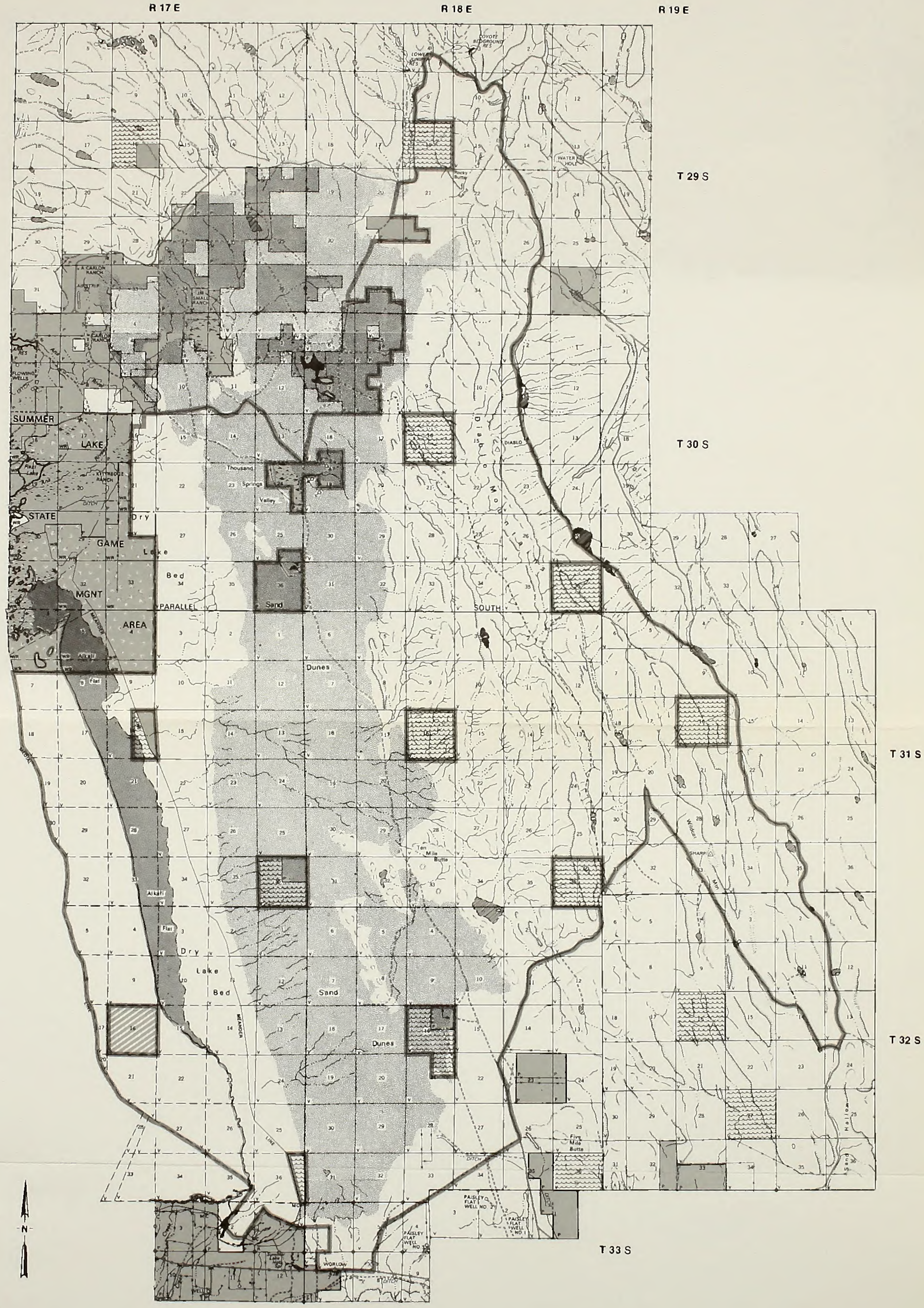
Bureau of Land Management
Lakeview District

Diablo Mountain WSA
OR-1-58

LOCATION MAP

MAP 1



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Lakeview District

Diablo Mountain WSA
OR-1-58

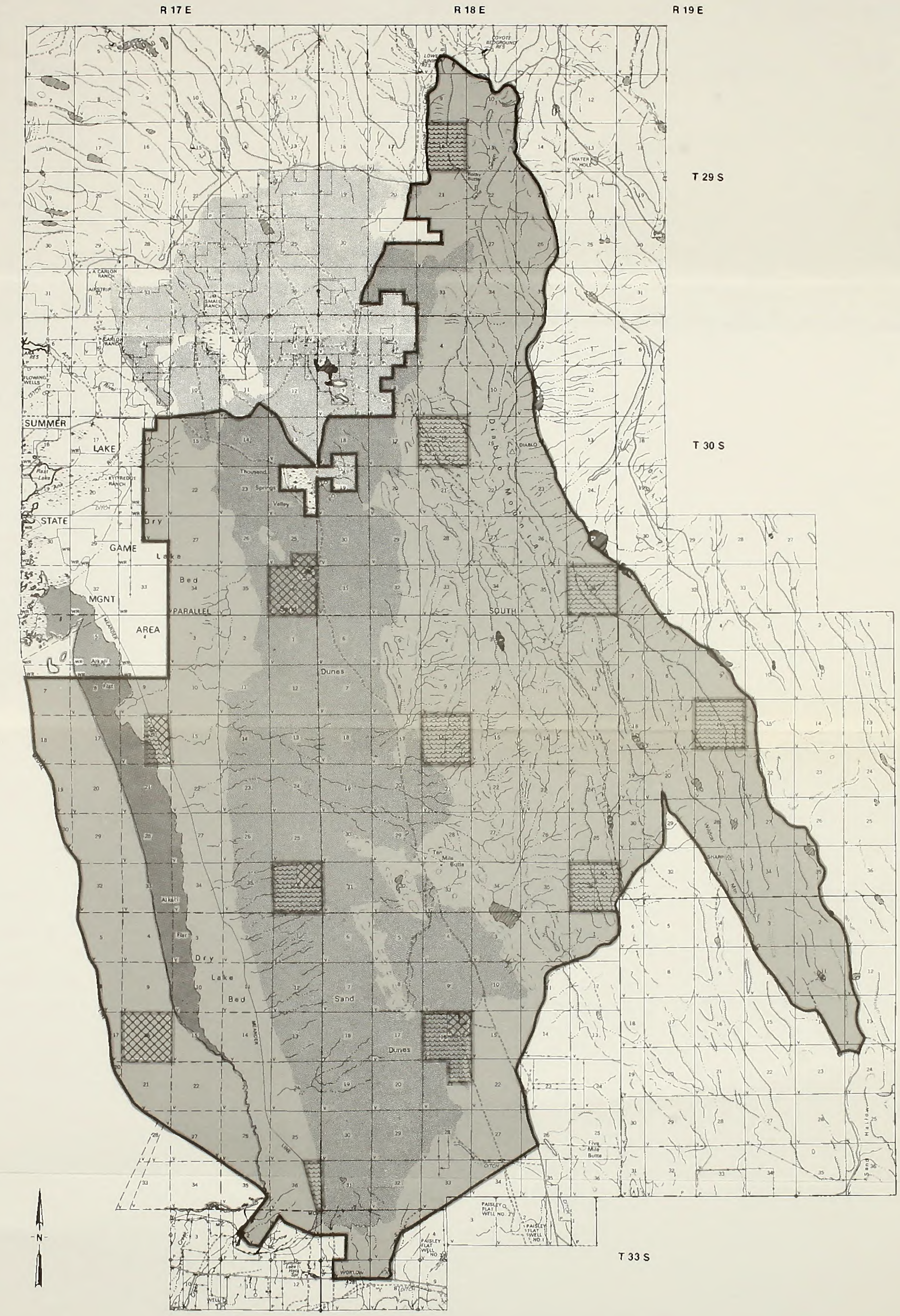
LAND OWNERSHIP

0 1 2 MILES

LEGEND

▬	Wilderness Study Area Boundary
☐	Bureau of Land Management
▨	State
▩	Private
▦	State Wildlife Refuge
▤	BLM Surface-State or Private Subsurface (Split Estate)
▒	Sand Dunes

MAP 2



LEGEND

▬ Wilderness Study Area Boundary

▢ Recommended Suitable for Wilderness

▩ Non-Federal Land within Recommended Wilderness

▤ Non-Federal Minerals (Split Estate) within Area Recommended for Wilderness

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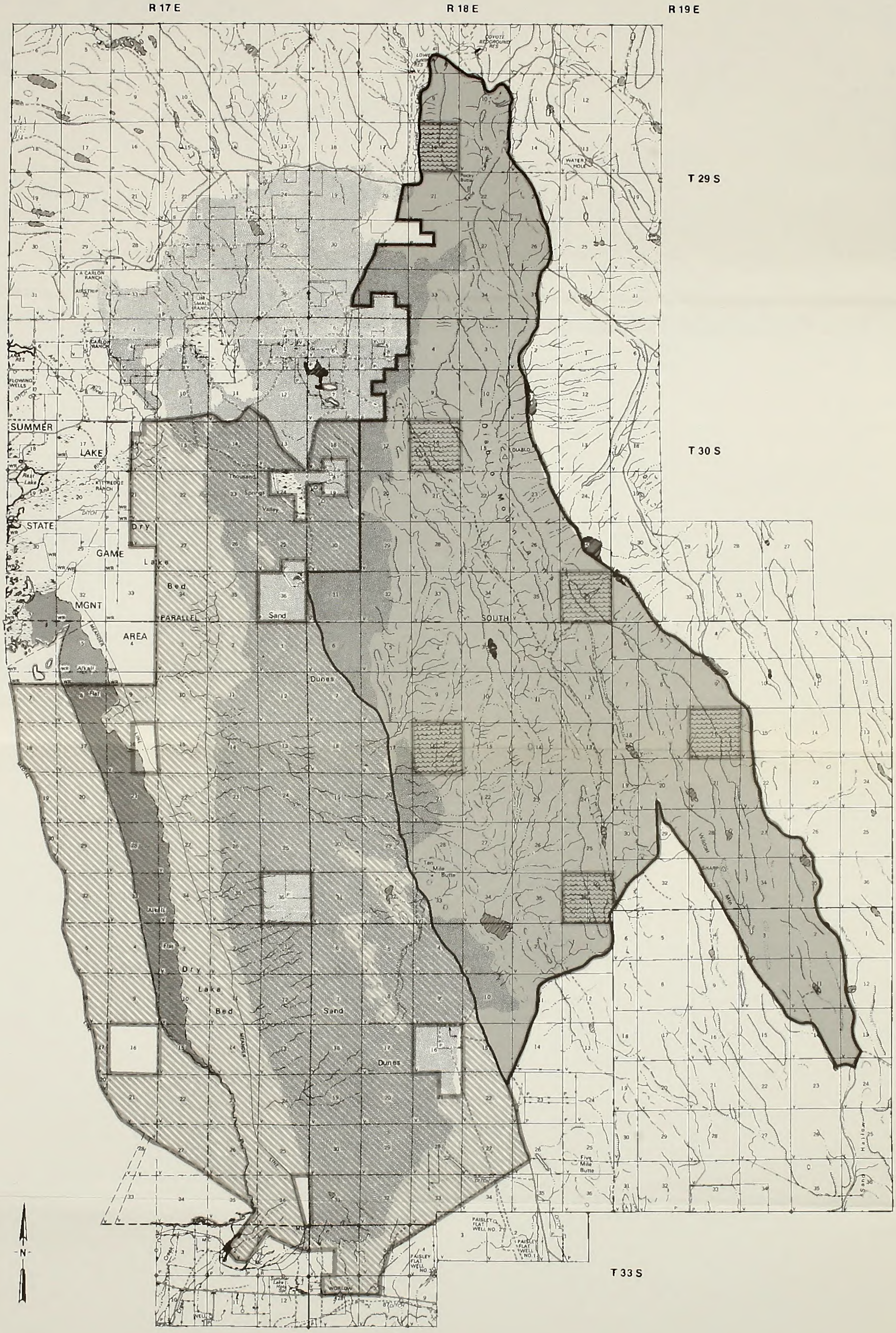
Diablo Mountain WSA
OR-1-58

ENHANCED ALTERNATIVE

1 0 1 2 MILES

MAP 3



LEGEND

- ▬ Wilderness Study Area Boundary
- ▩ Recommended Suitable for Wilderness
- ▨ Recommended Non-suitable for Wilderness
- ▦ Non-Federal Minerals (Split Estate) within Area Recommended for Wilderness

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Diablo Mountain WSA
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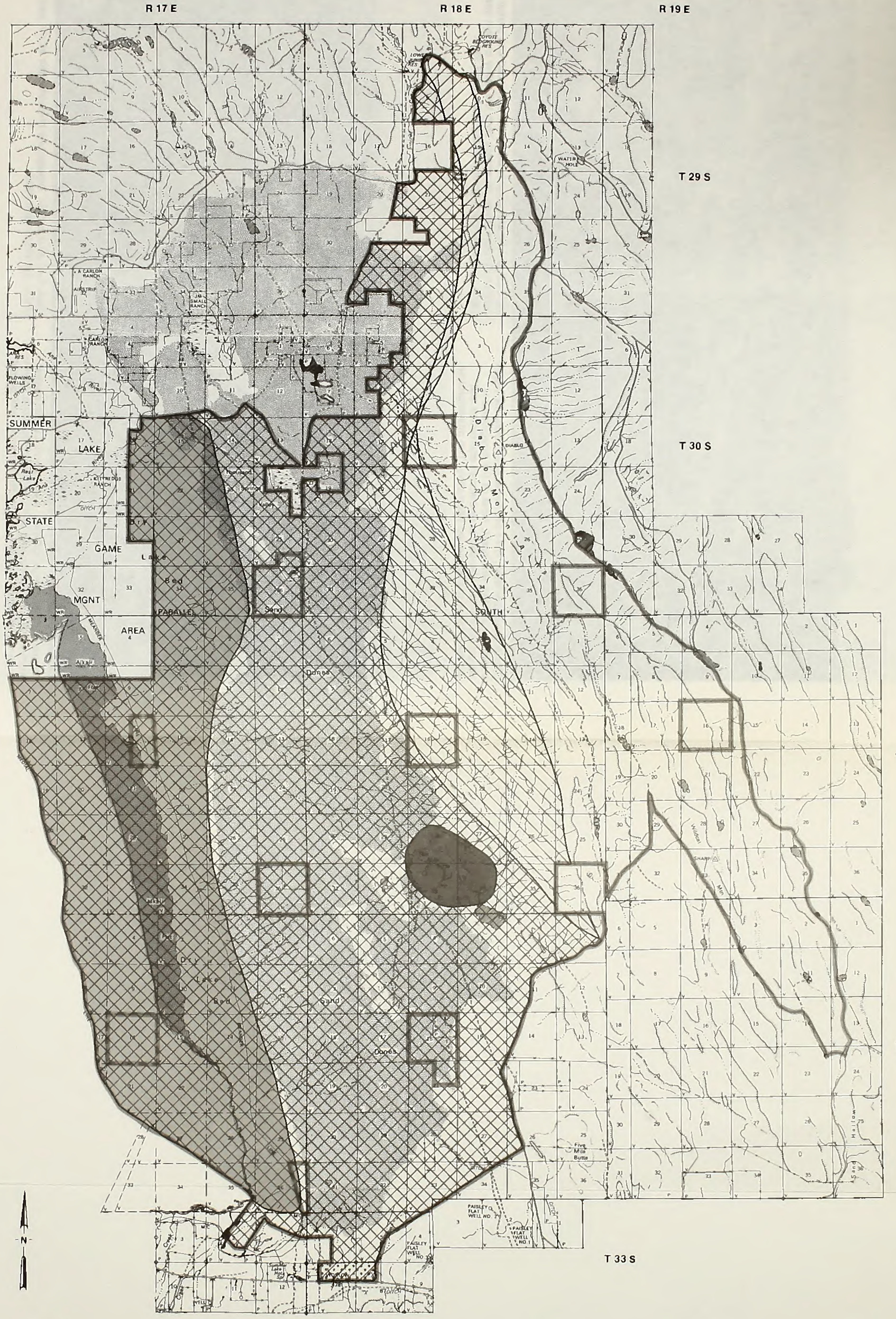
PARTIAL ALTERNATIVE

1 0 1 2 MILES

MAP 4



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Diablo Mountain WSA
OR-1-58

MEDIUM OR HIGH POTENTIAL MINERAL OR ENERGY RESOURCES

1 0 1 2 MILES

MAP 5

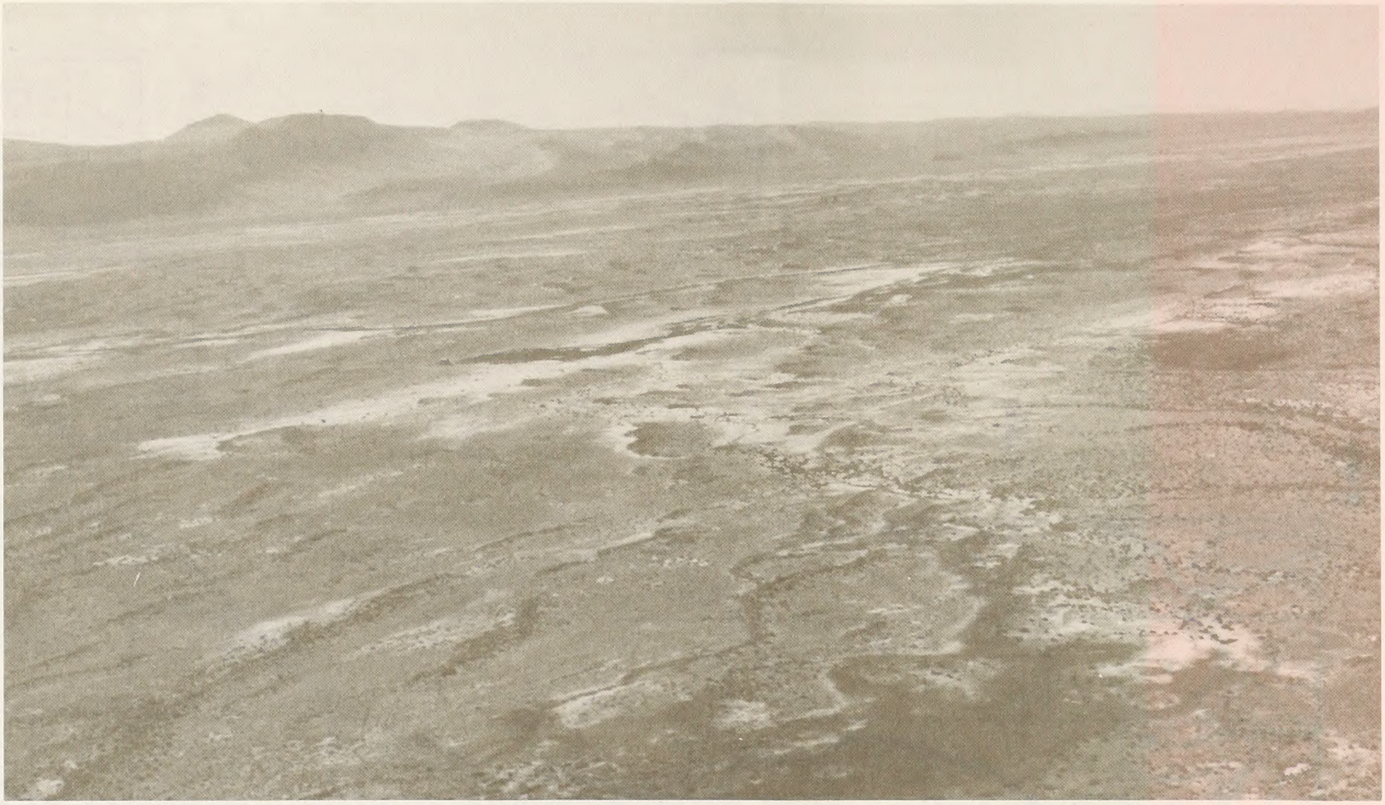
■ **High Potential**
(4D) for Limestone

▨ **Medium Potential**
(3B) for Limestone and
(3C) for Diatomite

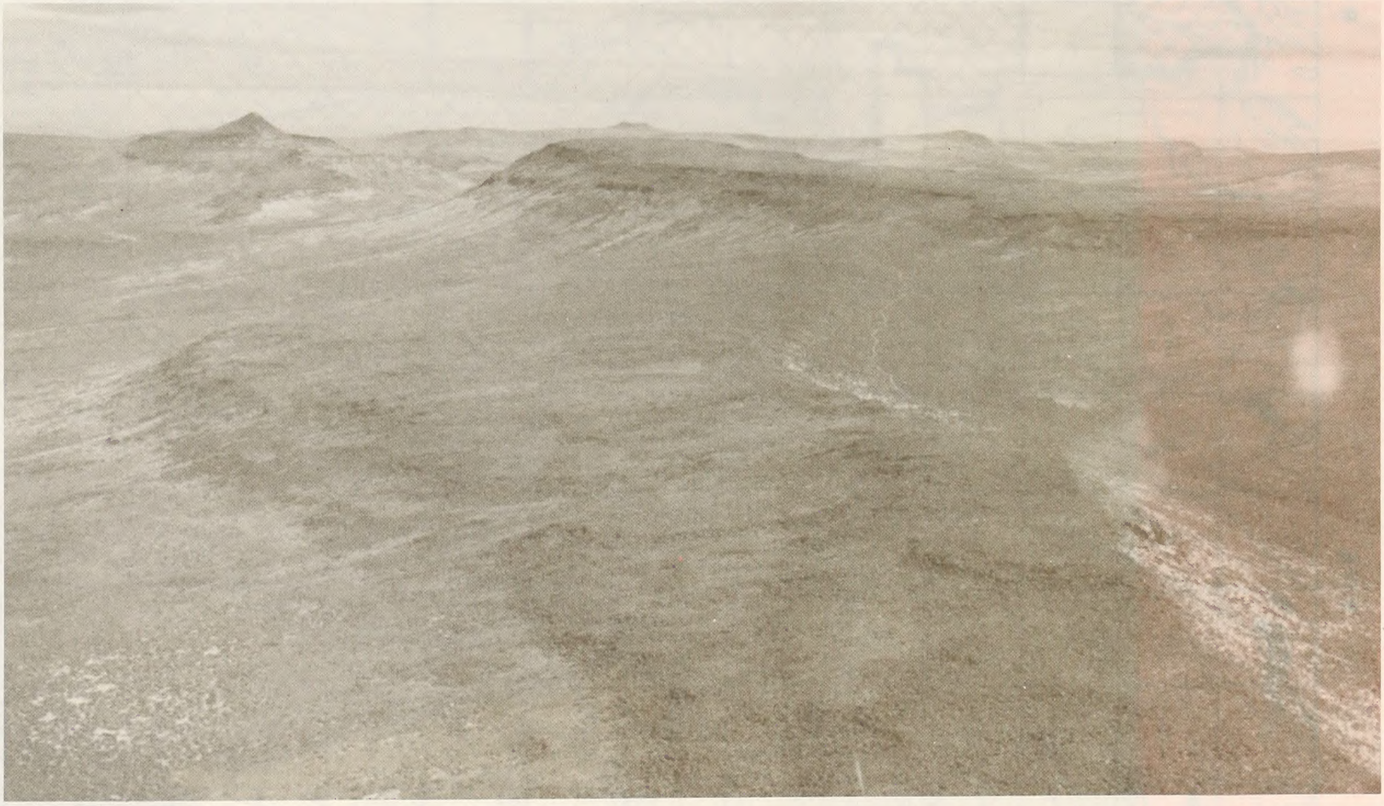
▒ **Medium Potential**
(3B) for Sodium, Potassium,
Lithium and Boron

▧ **Medium Potential**
(3C) for Geothermal and
(3B) for Oil and Gas

░ **High Potential**
(4D) for Geothermal Resources
(Also, Portion of WSA within known
Geothermal Resource Area)



Diablo Mountain WSA, OR-1-58. Aerial photo from the north boundary looking southeast. Most of the foreground is nonsuitable under the partial (preferred) alternative and suitable under the enhanced alternative. The middleground and background are suitable under the enhanced and partial (preferred) alternatives. Illustrates both the valley bottom and ridges in the northern portion of the WSA. April 1980.



Diablo Mountain WSA, OR-1-58. Aerial photo in east-central portion of the WSA looking north to Diablo Mountain. Within area recommended suitable under the enhanced and partial (preferred) alternatives. Topography characteristic of the east half of the WSA. April 1980.

Appendix to the Wilderness Environmental Impact Statement for Oregon

Orejana Canyon Wilderness Study Area (OR-1-78)

General Description of Study Area

Orejana Canyon wilderness study area (WSA) is located in Harney County 30 miles northeast of the small town of Plush, Oregon (see map 1). The nearest highway is U.S. Highway 395 some 35 miles to the west of the WSA. Oregon State Highway 140 is approximately 40 miles to the south. Access from either highway is via dirt roads.

Roughly oblong in shape, the study area contains 24,600 acres, all of it public land (see map 2). The surrounding lands are primarily public except for a state block of land on the west in the north end of Warner Valley. A half-mile dead-end road extends into Shingle Reservoir from the east side of the WSA, forming part of the boundary.

Topographic features include the 500-foot-high Orejana Rim and the 8-1/2-mile-long Orejana Canyon which runs most of the length of the WSA from north to south. There is a flat tableland between the rim and the canyon known as The Island, and the north end of the WSA is a broad swale known locally as The Basin.

Vegetation in the study area is sagebrush/bunchgrass.

Interrelationships

The Orejana Canyon WSA is approximately four miles north of the Hart Mountain National Antelope Refuge administered by the U.S. Fish and Wildlife Service.

Issues

Issues relating to each WSA were raised by BLM and the public during the wilderness inventory and EIS planning and scoping process. These issues concern both the effects of wilderness designation on existing and potential land uses or resources in the WSA, as well as the effects of existing and potential land uses or resources on wilderness values. The one issue raised specifically for this WSA was the effect of wilderness designation on existing grazing use and developments in The Basin.

Description of Alternatives

The following alternatives are analyzed:

- all wilderness
- partial (preferred)
- no wilderness/no action.

All Wilderness

The all wilderness alternative would recommend all 24,600 acres of the WSA suitable as wilderness (see map 2.) For purposes of analysis, it is assumed the dead-end road would remain open to vehicles.

Partial (Preferred Alternative)

The partial alternative would recommend 14,800 acres suitable as wilderness (see map 3). Some 9,800 acres, including the area in The Basin and west of the rim on the north would be recommended nonsuitable. The north boundary would follow a fence that runs northeast to southwest across the sixth standard parallel. At the rim, the boundary would follow a section line west to intersect the boundary trail below the rim. The Orejana Rim and canyon are in the area recommended suitable for wilderness.

No Wilderness/No Action

The no wilderness/no action alternative would recommend the entire WSA nonsuitable as wilderness. It represents the situation most likely to occur without wilderness designation. The area would be managed according to the current land use plan, which includes the following features relevant to this analysis:

- implementation of proposed livestock projects, including vegetative manipulation,
- development of proposed wildlife projects, including guzzlers (small wildlife watering devices) and vegetative manipulation,
- continued availability for mineral exploration and development, and
- closure to ORV use from May 1 to June 15, if vehicle harassment of bighorn sheep occurs.

Table 1 summarizes the proposed management of the WSA under each alternative.

Table 2 summarizes the environmental consequences of each alternative.

Table 1. Summary of Proposed Management Under Each Alternative, Orejana Canyon WSA (OR-1-78)

Proposed Management	All Wilderness	Partial	No Wilderness/ No Action
Acres Designated as Wilderness	24,600	14,800	0
Acres Closed to ORVs by Wilderness Designation	24,600	14,800	0
Miles of Ways Closed	13	2	0
Acres Withdrawn from Mineral Location and Leasing by Wilderness Designation	24,600	14,800	0
Structural Wildlife Projects Developed: Catchments & Guzzlers (number)	0-5	0-5	5
Vegetative Manipulation for Wildlife: Brush Control with Seeding (acres)	0	0	460
Vegetative Manipulation for Livestock: Brush Control Without Seeding (acres)	0	0	960

Manageability of the Area as Wilderness

The areas recommended suitable for wilderness in the all wilderness and partial alternatives would be manageable as wilderness.

Rationale for the Selection of the Preferred Alternative

The partial alternative is preferred because it would preserve the high wilderness values in the Orejana Canyon area and on The Island between the rim and the canyon.

The area recommended nonsuitable north of the fence has very limited wilderness qualities and the benefits of preserving those values would be outweighed by leaving the area open for development of resources and for activities, such as the use of motorized vehicles, which would be incompatible with wilderness management.

Affected Environment

This section discusses only those activities or resources that influence the character of the study area, or that may be affected by the alternatives.

Wilderness Values

Naturalness

The area around Orejana Canyon and on The Island is predominantly natural in appearance. The portion of the study area north of the fence, The Basin, shows signs of human activity. Much of the

Table 2. Summary of Environmental Consequences of Alternatives, Orejana Canyon WSA (OR-1-78)

Resource or Activity	All Wilderness	Partial (Preferred Alternative)	No Wilderness/No Action
Wilderness Values	Would add 24,600 acres to the NWPS. Natural features preserved on entire WSA, including Orejana Canyon, The Island, potential raptor nesting sites, and bighorn spring range. The area would be manageable as wilderness.	Would add 14,800 acres to the NWPS. 9,800 acres recommended nonsuitable. Effects in area recommended suitable would be same as all wilderness. Possible adverse effects to naturalness from livestock improvements in nonsuitable area. The area would be manageable as wilderness.	WSA would be subject to impairment of wilderness features from livestock grazing developments and wildlife habitat projects.
Energy and Mineral Development	Development precluded on 24,600 acres, including 2,200 acres with moderate potential for diatomite.	Development precluded on 14,800 acres, including 2,100 acres with moderate potential for diatomite.	No impact.
Vegetation	Vegetation preserved.	Vegetation preserved in suitable area.	Vegetation diversity reduced on 1,420 acres by burn-for-release and burn-and-seed. Seedings could reduce livestock pressure on native range outside seedings.
Wildlife	Wildlife habitat preserved. 460-acre burn-and-seed may be precluded. Guzzlers might also be precluded. No significant change in wildlife numbers.	Same as all wilderness. Wildlife habitat preserved in suitable area.	460-acre burn-and-seed for habitat improvement realized. Guzzlers would be installed. No significant change in wildlife numbers.
Livestock Grazing	Vegetative manipulation precluded, and 226 AUM increase within WSA foregone. Livestock AUMs will remain the same within the allotment. Minor impact to management practices due to vehicle restrictions.	Same as all wilderness.	No impact. 226 AUM increase realized within WSA from livestock and wildlife vegetative manipulation, but overall no change in AUMs within allotment.
Economic Value and Local Income	Decrease in annual economic value could range from $1,878 to $171, depending on what proposed projects would be allowed in wilderness. Local personal income would not change. Both sets of figures exclude unknown economic effects of mineral development and of unquantified changes in recreation use.	Same as all wilderness.	Decrease in economic value by $2,867 and no change in local personal income.

basin is influenced by the large earth mounds of Hartman Reservoir and a number of trails and ways (vehicle routes established and maintained solely by the passage of vehicles.) Developments in the remainder of the WSA do not have any substantial impact, either locally or as a whole.

There are a total of 11 reservoirs and waterholes in the WSA, 2 of which are barely noticeable. There are approximately 11 miles of vehicle ways in The Basin and less than 2 miles in the rest of the area.

Internal man-made features influence 2 percent of the WSA. (The area of influence is an estimate of acreage within the WSA from which these man-made features can be seen.) Overall, the WSA south of the fence appears natural, with the evidence of man (waterholes, small corral) substantially unnoticeable. North of the fence, man-made features detract from the naturalness.

Opportunities for Solitude or Primitive and Unconfined types of Recreation

Outstanding opportunities for solitude are available in Orejana Canyon and on The Island between Orejana Rim and the canyon. The canyon is fairly wide and the entire eight-mile length offers opportunity for isolation even with moderate levels of use. The Island is isolated topographically and is large enough, with only sagebrush cover, to afford ample opportunities for solitude. The Basin offers few opportunities for solitude, because of the openness of the terrain and the livestock management activities which occur in that area.

Potential for primitive recreation, including hiking, photography and nature study, are best in the canyon area, with somewhat more limited opportunities above the canyon. Orejana Rim offers opportunities for geologic sightseeing with unique obsidian flows and paleontological features.

Special Features

Orejana Rim is one of a series of high fault block scarps responsible for the distinctive basin and range topography of southeastern Oregon. The rim contains exceptionally clear obsidian of geologic interest, as well as paleontological features. The area has a high potential for raptor nesting and is used by bighorn sheep in the spring.

Diversity in the National Wilderness Preservation System (NWPS)

According to the Bailey-Küchler system of classifying ecosystems, the Orejana Canyon WSA is located in the Intermountain Sagebrush Province with a potential natural vegetation of sagebrush steppe. Big sagebrush/Idaho fescue and low sagebrush/Sandberg's bluegrass are the only vegetative communities known to occur in the WSA and that are listed in the Oregon Natural Heritage Plan in the Basin and Range section.

There are 3 standard metropolitan statistical areas over 100,000 population within 5 hours' driving time of the WSA: Eugene/Springfield and Medford, Oregon, and Boise, Idaho.

Energy and Mineral Development

Energy and mineral resources were evaluated by BLM using available geologic data and data provided in a report by TERRADATA, a consulting firm under contract with BLM. The report is titled "Assessment of Geology, Energy, and Minerals Resources of the Mule Springs Valley Geologic Resource Area." The WSA is within the Mule Springs Valley geologic resource area which has been classified according to a rating system that indicates both the potential for occurrence (geologic favorability) of certain minerals, as well as the quantity and quality of data on which the rating is based (confidence level.) A description of the rating system is provided in the Statewide EIS volume.

Portions of the WSA have been rated moderate for the occurrence of diatomite.

Table 3 gives the mineral potential classifications for the WSA. Map 4 shows the portions of the WSA rated moderate (medium) for diatomite.

There are no known mineral deposits in the WSA, or within several miles of the WSA. As of January 1, 1984, there were no geothermal or oil and gas leases and no mining claims in the WSA.

Surface rocks of the WSA are mostly Tertiary welded and nonwelded tuffaceous sedimentary rocks and basalt flows. The subsurface geology is largely unknown, but pre-Tertiary marine sedimentary rocks may exist at depth.

Vegetation

Vegetation in the northern half of the WSA consists of intermingled communities of low sagebrush/Sandberg's bluegrass and big sagebrush/ Sandberg's bluegrass. The southern

Table 3. Classification of Energy and Mineral Potential, Orejana Canyon WSA (OR-1-78)

Commodity	Area	Classification Level	Confidence Level
Metals	Entire WSA	1	B
Geothermal	Entire WSA	2	B
Uranium/Thorium	Entire WSA	1	A
Coal	Entire WSA	2	B
Oil/Gas	Entire WSA	2	A
Limestone	Entire WSA	1	A
Bentonite	Entire WSA	1	A
Diatomite	See map 4	3	B
	Rest of WSA	2	B
Zeolites	Entire WSA	2	B
Perlite	Entire WSA	2	B

Legend:
Class 1 - Lack of indications of favorability
Class 2 - Low favorability
Class 3 - Moderate favorability
Class 4 - High favorability

Confidence Level A - Insufficient data or no direct evidence
Confidence Level B - Indirect evidence available
Confidence Level C - Direct evidence but quantitatively minimal
Confidence Level D - Abundant direct and indirect evidence

half of the study area is comprised of big sagebrush/Thurber's needlegrass, big sagebrush/Sandberg's bluegrass and big sagebrush/cheatgrass. Big sagebrush/Idaho fescue is common in Orejana Canyon.

The vegetative communities are early- to mid-seral (a stage of ecological condition based on the difference between present plant community and climax vegetation, the relatively stable, final stage in plant succession.) Common wildflowers include milk-vetches, sagebrush violet, Nevada desert-parsley, long-leaved phlox, stemless goldenweed and yellow bells.

Wildlife

Orejana Rim has high potential for raptor nesting sites.

The area is used as spring range by bighorn sheep which spend the balance of the year on Hart Mountain. Should off-road vehicle (ORV) harassment of the bighorn occur, the area would be closed to ORV use from May 1 to June 15. There is no existing problem.

Approximately 460 acres within the WSA are proposed for burning followed by seeding as part of a series of projects designed to increase the total deer population in BLM's Warner Lakes resource area by 11 percent. Five big game guzzlers (small wildlife watering devices) are also proposed for placement along Orejana Rim and in the canyon. These projects would provide permanent water which would aid in the establishment of a resident herd of bighorn sheep in an area that now receives only seasonal use. Also proposed is closing some three miles of vehicle way into the north end of the canyon to reduce pressure on bighorn sheep from vehicles.

Livestock Grazing

Portions of 3 grazing allotments are within the WSA. Table 4 shows existing and potential livestock use in the study area in AUMs (animal unit months, the amount of forage needed to sustain one cow and a calf, or equivalent animals, for one month.)

Existing livestock projects in the WSA (among the man-made features mentioned in the Naturalness section) include 11 reservoirs and waterholes. Some 960 acres of burn-for-release to improve livestock distribution and 460 acres of burn-and-seed are proposed in the Orejana Rim allotment. The 460 acres of burn-and-seed is a wildlife project to improve spring range for wildlife which would also provide 120 AUMs of livestock forage within the WSA.

These projects (totaling 1,420 acres) have the potential to increase livestock forage by 226 AUMs within the WSA portion of the allotment. As a result of these projects and a change in the utilization pattern within the allotment, 226 AUMs would be moved from another part of the allotment to the WSA portion of the allotment. Livestock use within the allotment would not change, regardless of whether or not the projects were implemented.

Livestock operators use motor vehicles on the ways within the WSA primarily for checking livestock and salting. Livestock are gathered by horseback within the area. The Ryegrass Corral is also used to gather injured, sick, or stray livestock to be trucked out of the area.

Recreation Use

Current recreation use is essentially limited to deer

Table 4. Existing and Potential Livestock Use, Orejana Canyon WSA (OR-1-78)

Grazing Allotment	Licensed AUMs in Allot.	Period of Use	Percent of Allot. In WSA	Current Actual Use in WSA (AUMs)	Potential Increase in WSA (AUMs)[1]
Northeast Warner (No. 511)	5,956	2/1-09/30	7.3	435	0
North Bluejoint (No. 512)	289	5/1-07/31	0.7	2	0
Orejana Rim (No. 510)	1,423	4/1-10/31	23.9	340	226
Total	7,668			777	226

[1] Increases might or might not result in increased licensed use in the allotment (see narrative).

hunting. This activity is closely tied to vehicle use. Recreation use in the area is low.

Economic Value and Local Income

Livestock grazing and recreation are the only resource outputs which generate economic activity in this WSA. The WSA currently produces 777 animal unit months (AUMs) of livestock forage and an unknown amount of recreation activity annually. As of January 1, 1984, there were no oil and gas leases or geothermal leases on the WSA.

The economic value of existing outputs amounts to $5,859 annually and local personal income generated by existing outputs amounts to $6,480 annually. The terms economic value and local personal income are discussed in the Statewide EIS volume.

Environmental Consequences

This section discusses the environmental consequences of implementing each of the alternatives. Resources and activities not significantly affected by any of the alternatives are not discussed. General impact conclusions applicable to all WSAs, including impact conclusions based on speculative future developments (developments which are possible, but are not currently proposed), are discussed in the Statewide EIS volume. That volume also discusses certain assumptions that were made for this analysis.

Effects on Wilderness Values

The all wilderness alternative would add 24,600 acres to the National Wilderness Preservation System (NWPS). This would provide wilderness protection to Orejana Canyon, Orejana Rim, The Island between the rim and canyon, potential raptor nesting sites, and bighorn sheep spring range.

The **partial alternative** would add 14,800 acres to the NWPS. It would recommend as nonsuitable the 9,800 acres north of the fence in the north part of the WSA. Orejana Rim and canyon, The Island, the potential raptor nesting sites, and bighorn sheep spring range would be preserved as wilderness. The Basin and the land west of the rim would be used primarily for grazing. Possible range improvements could adversely affect naturalness in this portion.

Under the **no wilderness/no action alternative**, and in the portions recommended nonsuitable under the partial alternative, any mineral development could adversely affect wilderness values, including the area's special wilderness features and opportunities for solitude and primitive recreation. Some adverse effects from oil and gas or geothermal lease development could be mitigated through lease stipulations.

Under the no wilderness/no action alternative, proposed vegetative manipulation projects for livestock (burn-for-release) and wildlife (burn-and-seed) would adversely affect wilderness values. Other range developments might also be installed, and they could adversely affect wilderness values.

Effects on Energy and Mineral Development

Areas designated wilderness would be withdrawn from mineral exploration and development: 24,600 acres under the **all wilderness alternative** and 14,800 acres under the **partial alternative**.

The withdrawal under the all wilderness alternative would include the entire 2,200-acre portion rated moderate for diatomite; 2,100 acres of this portion would be withdrawn under the partial alternative.

No acreage would be withdrawn under the **no wilderness/no action alternative**.

Effects on Vegetation

Areas designated wilderness would not be subject to most surface disturbing activities. Vegetation dependent upon the existing undeveloped environment would thus be maintained.

Under the **no wilderness/no action alternative**, 460 acres of burn-and-seed would temporarily reduce vegetation diversity by eliminating shrubs and forbs and converting the area to crested wheatgrass. An additional 960 acres of burn-for-release would also temporarily reduce vegetative diversity by reducing brush and forbs and increasing grasses.

These projects would also affect vegetation outside the seedings by changing distribution of livestock. This could be beneficial to native range plants outside the seedings by reducing the grazing pressure on the native range.

Effects on Wildlife

Wildlife habitat would be preserved in areas designated wilderness.

The **all wilderness and the partial alternatives** would have similar impacts on proposed wildlife project development. The proposed guzzlers might or might not be constructed, depending on a site-specific assessment of whether they conformed with the Wilderness Management Policy. Precluding the projects could result in loss of some deer in stress years, which would actually benefit other species (bald eagles, bobcats, raptors, cougars, etc.) that rely heavily on deer carrion for food. The proposed 460-acre burn-and-seed project in the southeast part of the WSA would be precluded under wilderness designation.

Proposed burn-for-release projects for livestock would be precluded under wilderness designation, and forage for wildlife produced by the projects would be foregone.

The **no wilderness/no action alternative** would allow for full development of wildlife water and forage projects. This could extend the season of use for bighorn sheep in the Orejana area.

Effects on Livestock Grazing

The effects of the **all wilderness and partial alternatives** would be the same. The proposed vegetative manipulation would not be allowed, foregoing an increase of approximately 226 AUMs of livestock forage within the WSA. Overall, livestock use in the allotment would not change. Livestock operators could not use vehicles to manage livestock unless there were no practical alternatives to using vehicles.

The vegetative manipulation projects have an overall benefit/cost ratio less than 1:1.

Under the **no wilderness/no action alternative**, proposed burn-for-release projects totaling 960 acres could be developed and, along with a 460-acre burn-and-seed project for wildlife, would increase forage in the WSA by 226 AUMs. However, livestock AUMs in the allotment would not change.

Effects on Economic Value and Local Income

The economic effects for the alternatives are presented in tables 5 and 6. Table 5 shows the effects on economic value and table 6, the effects on local personal income. It is not known at this time whether individual structural developments, such as the reservoir and guzzlers proposed for this WSA, would be constructed if the area were designated wilderness. It is known that vegetative manipulation projects, such as the proposed brush control, would not be allowed.

Table 5. Effects of Alternatives on Annual Economic Value, Orejana Canyon WSA (OR-1-78) (1981 price levels)

Item	Unit of Measure	All Wilderness, Partial	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS			
Grazing:			
Investment[1]	AUM	0	0
VALUE OF PLANNED INVESTMENTS[2]			
Grazing	$	0	0
Investments[3]	$	0 to -1,707	-2,867
Net Economic Value[4]	$	-1,707 to 0	-2,867
VALUE OF OTHER EXPECTED CHANGES IN OUTPUTS			
Reduced access[5]	$	-171	0
VALUE OF TOTAL EXPECTED CHANGES IN OUTPUTS			
All categories	$	-1,878 to -171	-2,867

[1] Expected future increases due to range improvement investments.
[2] A vegetative manipulation project involving up to $14,395 total expenditures, and structural project involving up to $18,620. Amounts shown in the table represent combined results of both types of projects, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.
[3] Average annual cost of investment expenditures amortized at 7.875% over 50-year period.
[4] For alternatives reflecting a range of negative net values (i.e., investment costs exceeding benefits), the figures are reversed to show the larger negative value as the lower end of the range (e.g., -20 to 0) so that the summation of effects for all categories in each column will show the full range of potential effects.
[5] Additional cost (shown as negative value) due to restriction of vehicular access for livestock operator.

Table 6. Effects of Alternatives on Local Personal Income, Orejana Canyon WSA (OR-1-78) (1981 price levels)

Item	Unit of Measure	All Wilderness, Partial	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS			
Grazing:			
Investment[1]	AUM	0	0
INCOME FROM PROPOSED INVESTMENTS[2]			
Grazing	$	0	0
Construction activity[3]	$	0 to +2,302	+4,082
Total[4]	$	0	0

[1] Expected future increases due to range improvement investments.

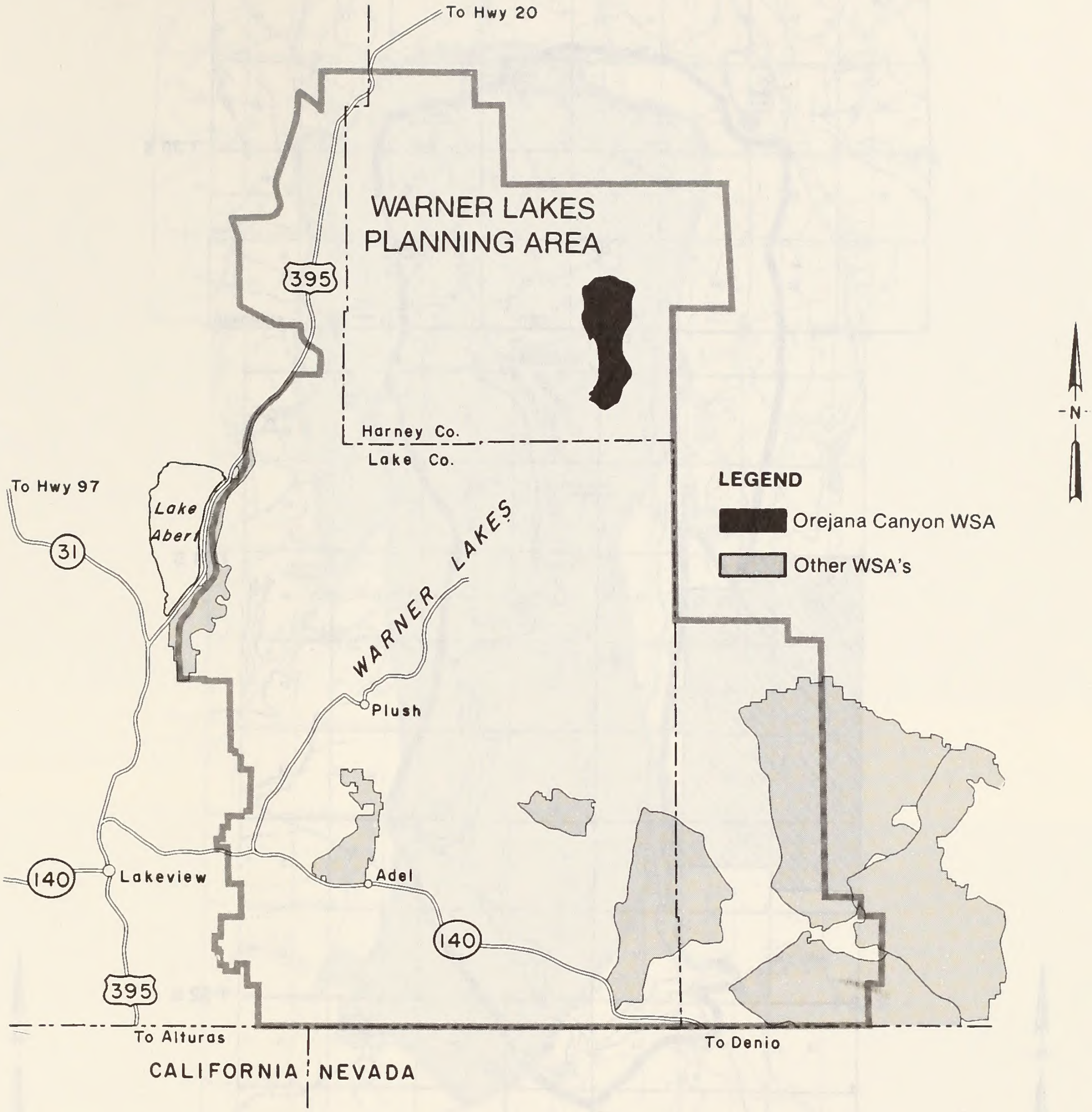
[2] A vegetative manipulation project involving up to $14,395 total expenditures, and structural project involving up to $18,620. Amounts shown in the table represent combined results of both types of projects, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

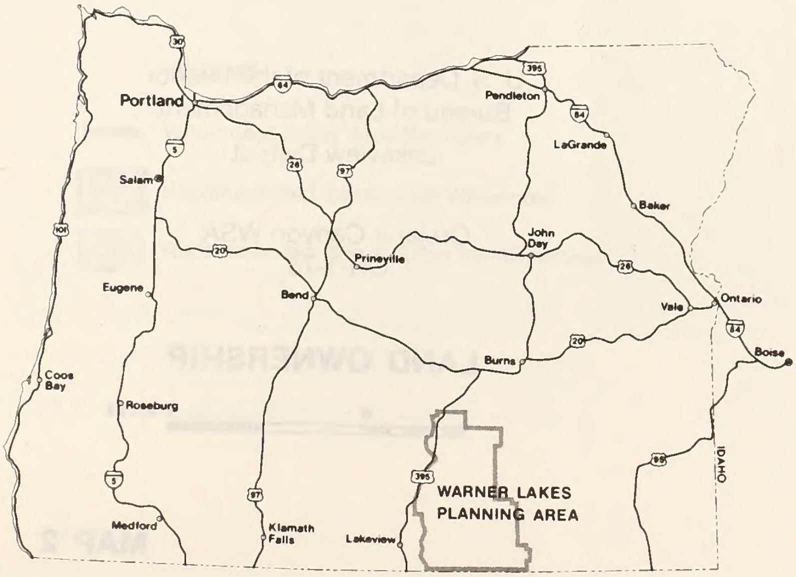
[3] Local personal income generated annually during assumed 5-year construction period. This amount cannot be added to the income resulting from grazing and hunting activity because it is not sustained over the analysis period.

[4] Detail may not sum to "Total" due to rounding. Total omits income from construction which is limited to 5-year period. See footnote 3.

The column for the wilderness alternatives shows the effects as a range of values dependent upon whether structural improvements, and/or grazing operator access were allowed.

Currently, there is little dependence on vehicles for livestock management in the study area. The wilderness alternatives would restrict such vehicle use unless there were no practical alternative. The maximum impact from road closures upon the grazing operator in the WSA would be an increase in cost of about $171 per year.





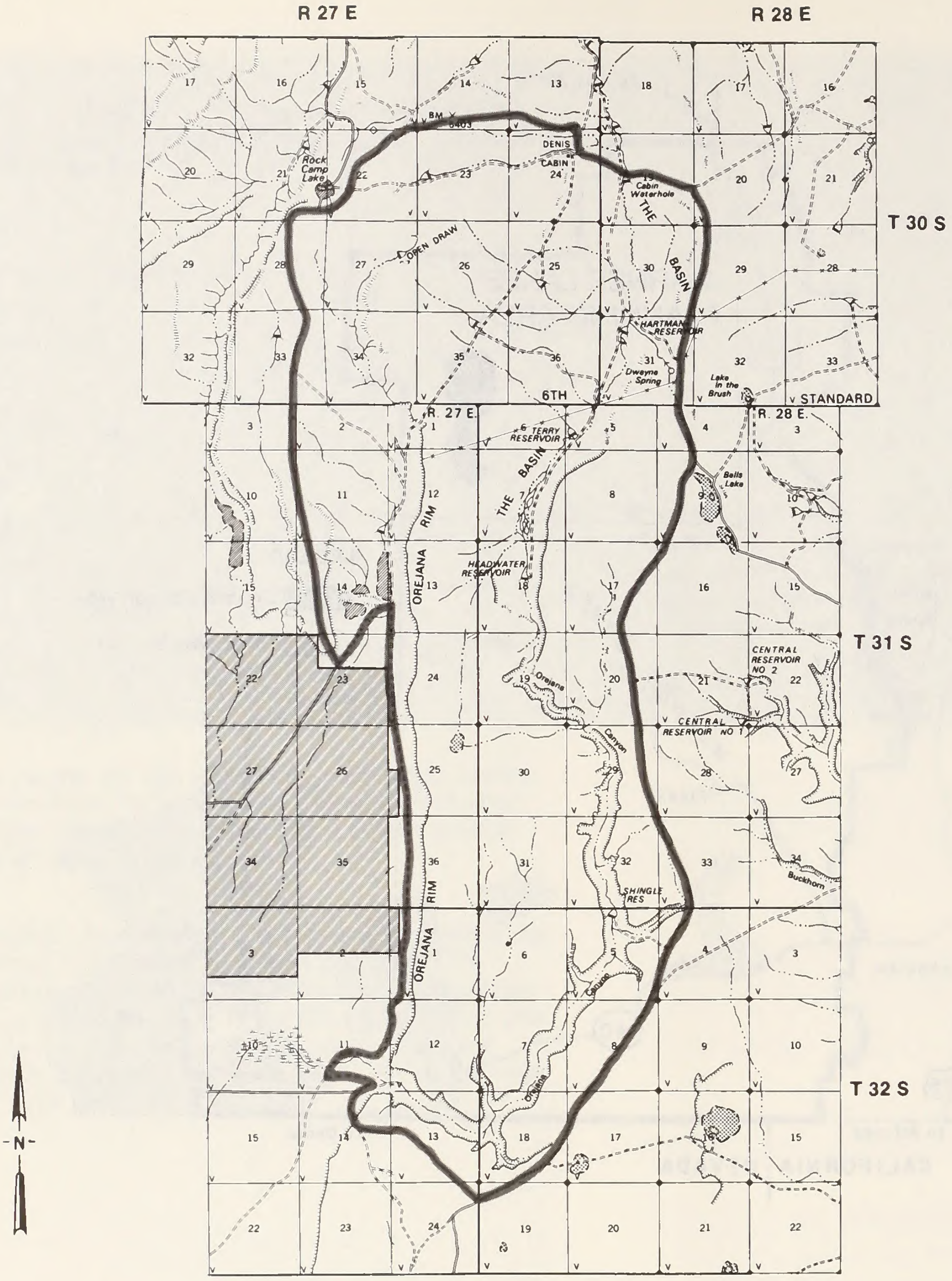
U. S. Department of the Interior
Bureau of Land Management
Lakeview District

Orejana Canyon WSA
OR-1-78

LOCATION MAP

10 0 10 MILES

MAP 1



LEGEND

▬ Wilderness Study Area Boundary

☐ Bureau of Land Management

▨ State

U. S. Department of the Interior
Bureau of Land Management

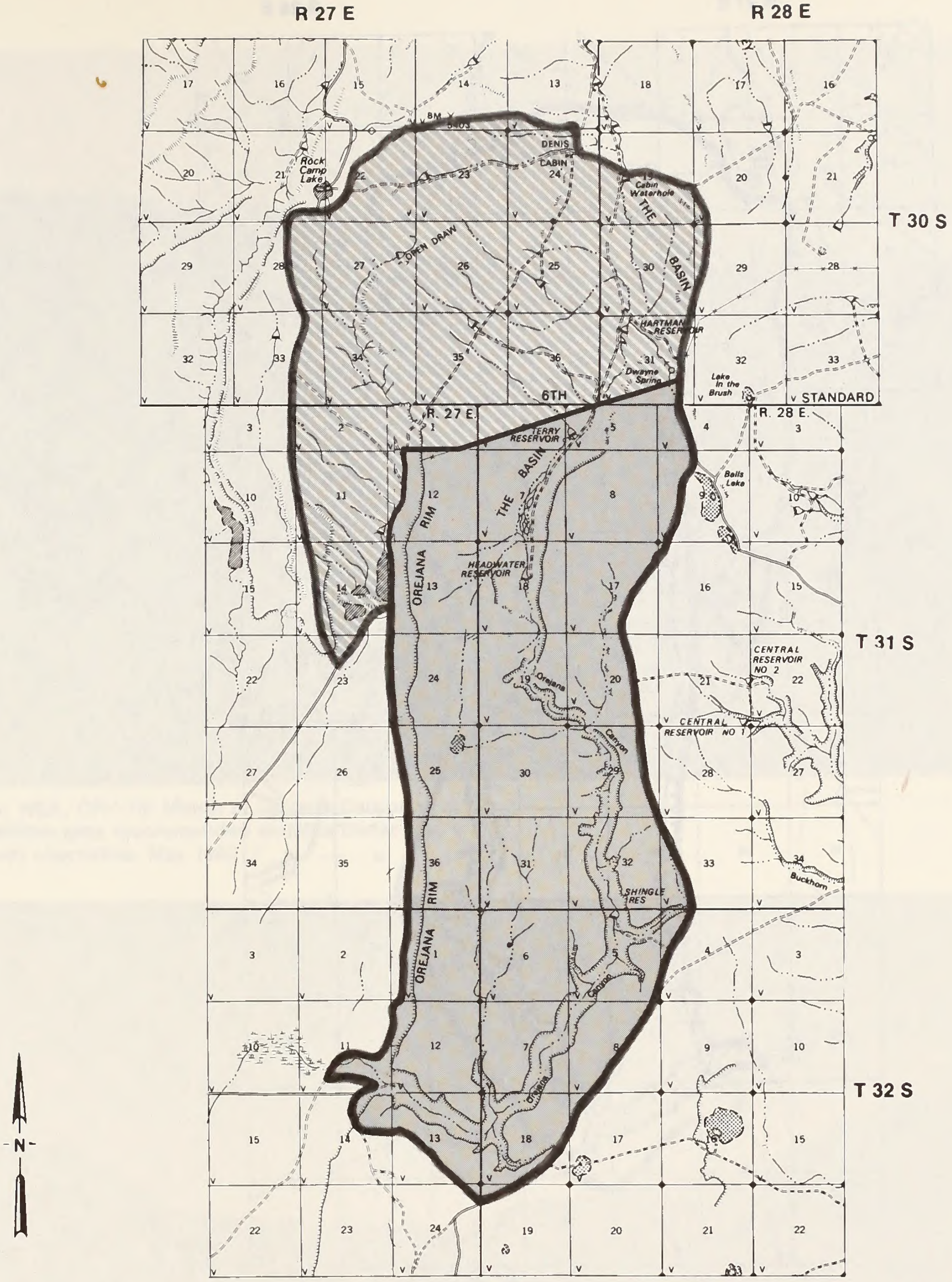
Lakeview District

Orejana Canyon WSA
OR-1-78

LAND OWNERSHIP

1 0 1 2 MILES

MAP 2



LEGEND

▬ Wilderness Study Area Boundary

▩ Recommended Suitable for Wilderness

▨ Recommended Non-suitable for Wilderness

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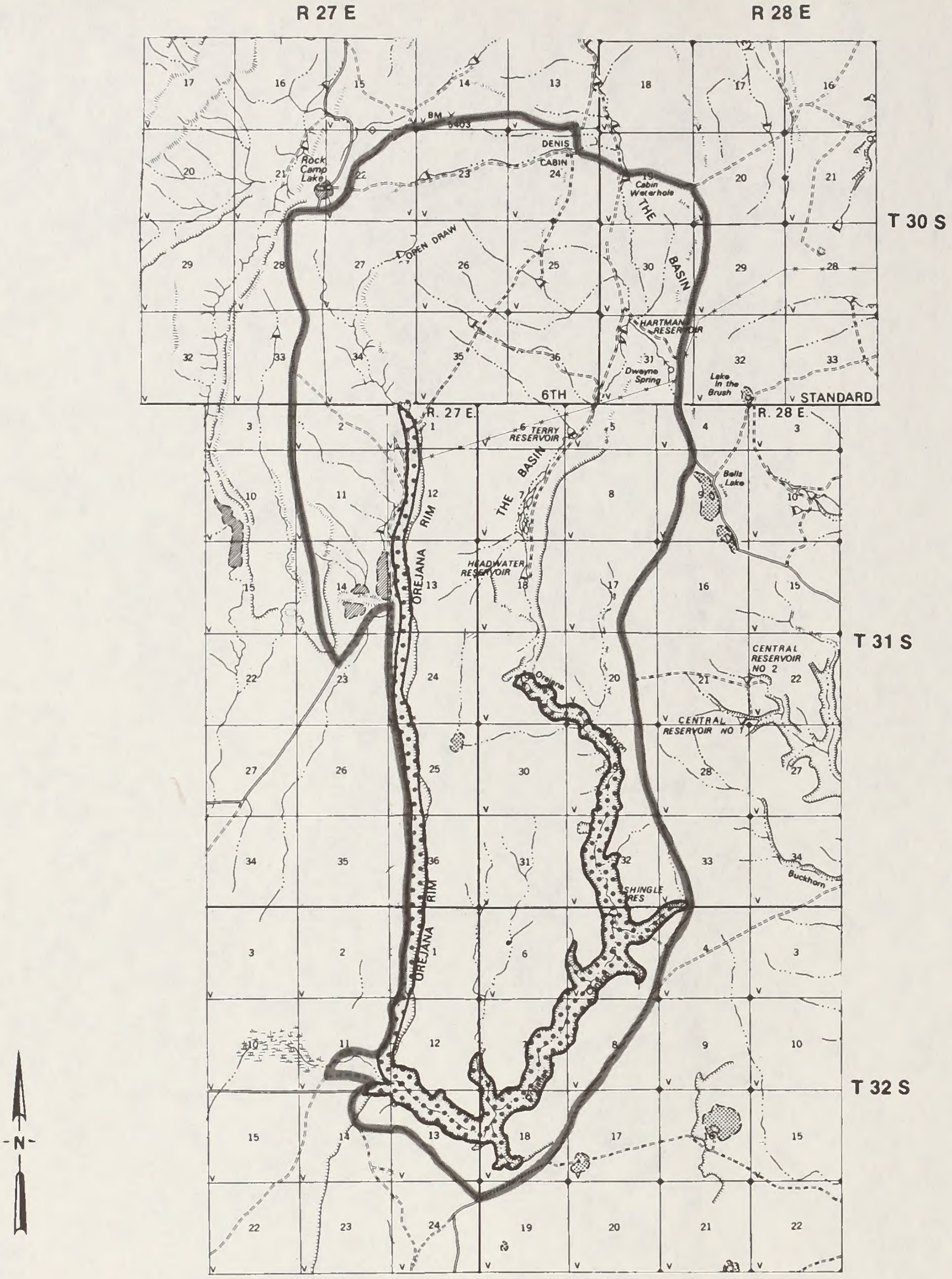
Lakeview District

Orejana Canyon WSA
OR-1-78

PARTIAL ALTERNATIVE

1 0 1 2 MILES

MAP 3



▨ Medium Potential (3B) for Diatomite

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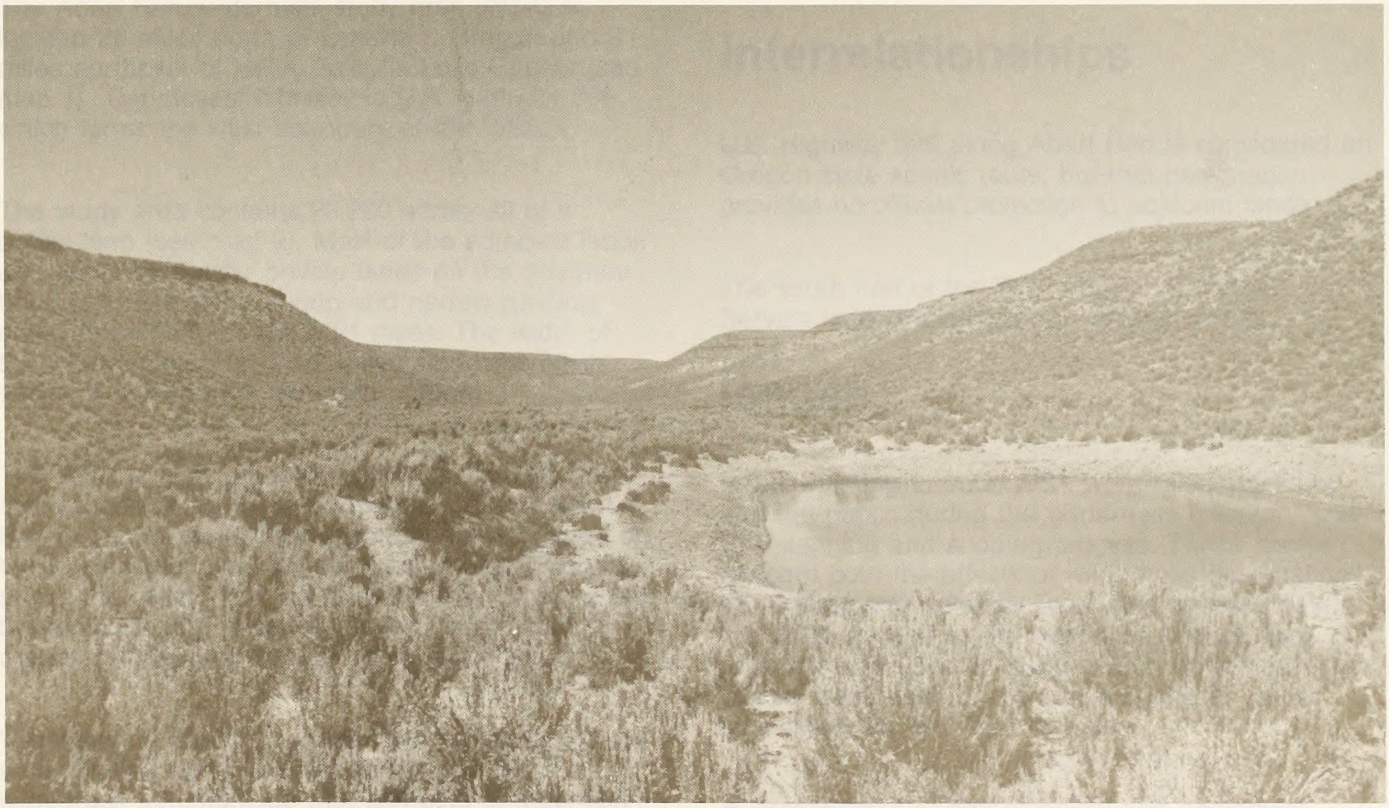
Orejana Canyon WSA
OR-1-78

MEDIUM OR HIGH POTENTIAL MINERAL OR ENERGY RESOURCES

MAP 4

Orejana Canyon WSA, OR-1-78. Mouth of Orejana Canyon looking west. Within area recommended suitable under the partial (preferred) alternative. May 1982.



Orejana Canyon WSA, OR-1-78. Looking north up Orejana Canyon from Shingle Waterhole. Within area recommended suitable under the partial (preferred) alternative. Shows a range development which does not impair wilderness qualities. August 1979.

Appendix to the Wilderness Environmental Impact Statement for Oregon

Abert Rim Wilderness Study Area (OR-1-101)

General Description of Study Area

The Abert Rim wilderness study area (WSA) is located 26 miles north of Lakeview, Oregon and 3 miles northeast of Valley Falls, in Lake County (see map 1). The closest highway is U.S. Highway 395 which forms the west boundary of the WSA.

The study area contains 23,280 acres, all of it public land (see map 2). Most of the adjacent lands are public except for private lands on the southern boundary. The WSA is long and narrow running along Abert Rim for some 21 miles. The width of the WSA varies from 1 1/2 miles along the north end to 4 miles in the southern portion.

The WSA is dominated by Abert Rim, a high, west-facing, fault scarp rising above Lake Abert. Abert Rim is one of the largest continuous fault scarps on the North American continent, rising over 2,000 feet above the valley. The top of the rim is characterized by gently sloping plateaus. Several intermittent creeks, ponds, and springs occur in the WSA.

Vegetation in the WSA varies from salt-desert shrub communities along Lake Abert to open big sagebrush communities with stringers of mountain mahogany, juniper, aspen, and ponderosa pines along the uplands. The ponderosa pines are an isolated stand of trees know as "Colvin Timbers" located some 5 miles north of Fremont National Forest in the southeast portion of the WSA. These trees are the most northerly location of ponderosa pines in the Warner Mountains.

Interrelationships

U.S. Highway 395 along Abert Rim is considered an Oregon state scenic route, but that designation provides no official protection to adjacent lands.

The south end of the WSA abuts U.S. Forest Service land of the Fremont National Forest.

Issues

Issues relating to each WSA were raised by BLM and the public during the wilderness inventory and EIS planning and scoping process. These issues concern both the effects of wilderness designation on existing and potential land uses or resources in the WSA, as well as the effects of existing and potential land uses or resources on wilderness values. Land uses or resources raised as issues specifically for the WSA include:

- preservation of archeological and geological features, ecological diversity, scenic views, wildlife, and the limited water supply; and

- mineral development of the WSA, particularly its effect on scenic qualities.

Description of the Alternatives

The following alternatives are analyzed:

- all wilderness (preferred alternative)
- no wilderness/no action

An enhanced wilderness alternative is not analyzed, because there are no viable opportunities to enhance wilderness values in the WSA through acquiring inholdings or closing dead-end roads. A partial alternative is not analyzed, because there are no viable opportunities to resolve conflicts with other resource uses by recommending only part of the study area as suitable.

All Wilderness (Preferred Alternative)

The all wilderness alternative would recommend all 23,280 acres of public land in the WSA suitable as wilderness (see map 2).

No Wilderness/No Action

The no wilderness/no action alternative would recommend the entire WSA nonsuitable as wilderness. It represents the situation most likely to occur without wilderness designation. The area would be managed according to the current land use plan, which includes the following features relevant to this analysis:

- continued availability for mineral exploration and development,

- implementation of 2 water developments to improve livestock distribution, and

- possible mortality-salvage logging in Colvin Timbers.

Table 1 summarizes the proposed management of the WSA under each alternative.

Table 1. Summary of Proposed Management Under Each Alternative, Abert Rim WSA (OR-1-101)

Proposed Management	All Wilderness	No Wilderness/No Action
Acres Designated as Wilderness	23,280	0
Acres Closed to ORVs by Wilderness Designation	23,280	0
Miles of Ways Closed	6	0
Acres Withdrawn from Mineral Location and Leasing by Wilderness Designation	23,280	0
Structural Livestock Projects Developed:		
Reservoirs & Waterholes (number)	0-1	1
Springs (number)	0-1	1

Table 2 summarizes the environmental consequences of each alternative.

Manageability of the Area as Wilderness

The area is manageable as wilderness. The boundaries of the WSA are well defined and easily enforceable as wilderness, though some irregularity of configuration occurs on the southeast. Access to the area in the southeast could require acquisition of private land easements.

Rationale for Selection of the Preferred Alternative

Abert Rim represents an outstanding scenic attraction in eastern Oregon with prime recreation opportunity. The area also supports bighorn sheep, a wildlife species highly identified with and dependent upon a wilderness type of management for protection of its habitat. The topographic relief, vegetative and wildlife diversity, outstanding recreational opportunities, as well as the naturalness and scenic qualities of the area contribute to this area's many wilderness values. The benefits of preserving those values outweigh the benefits of leaving the area open to development of potential mineral and other resources.

Affected Environment

This section discusses only those activities or resources that influence the character of the study area, or that may be affected by the alternatives.

Table 2. Summary of Environmental Consequences of Alternatives, Abert Rim WSA (OR-1-101)

Resource or Activity	All Wilderness (Preferred Alternative)	No Wilderness/No Action
Wilderness Values	Would add 23,280 acres to the NWPS. Would preserve the rugged steep slopes of Abert Rim and scenic area associated with the rim along Highway 395. Wilderness characteristics associated with vegetative diversity, wildlife habitat, solitude, archeological sites and Colvin Timbers would be protected from possible timber harvests and mineral exploration and development. Closure of 6 miles of ways would enhance wilderness values. The area would be manageable as wilderness.	Possible mineral and energy development, highway expansion, and timber harvesting could damage the wilderness values associated with wildlife habitat, scenic rim area, archeological sites, vegetative diversity, solitude, and naturalness of the area.
Energy and Mineral Development	Development precluded on 23,280 acres, including 23,280 acres with moderate potential for mercury, gold, and silver and 1,500 acres with moderate potential for geothermal resources.	No impact.
Vegetation	Vegetation preserved.	Mortality-salvage logging could accelerate natural succession in the Colvin Timbers. Two federal candidate species of special interest suspected to occur would be protected.
Wildlife	Wildlife habitat preserved.	Cavity nesting species, small mammals, raptors and bighorn sheep could be adversely affected by logging activities. Associated road improvement would increase visitors to detriment of wildlife.
Livestock Grazing	Continued improper livestock distribution if two water developments were not allowed. Reduced vehicle use would cause a minor inconvenience to livestock operators.	Spring development and construction of waterhole would improve livestock management and distribution.
Wood Products Harvest	Generally, no mortality-salvage logging would be allowed.	Mortality-salvage logging could take place.
Recreation Use	Primitive recreation opportunities enhanced, particularly hunting. Some loss of vehicle-oriented recreation, which is minimal due to the ruggedness of the area and lack of roads. Hang gliding would be prohibited. Net increase in overall recreation use in WSA.	Primitive recreation qualities could be adversely affected by vehicle-oriented recreation or logging in Colvin Timbers. Increased vehicle access due to any logging would adversely affect primitive recreation opportunities while increasing vehicle-oriented use. Negligible change in overall recreation use.
Economic Value and Local Income	Decrease in annual economic value could range from $490 to $37, depending on what proposed projects would be allowed in wilderness. Local personal income would not change. Excludes unknown economic effects of mineral development and unquantified changes in recreation use. The maximum increase in transportation costs to livestock operators with grazing permits would be $37.	Decrease in economic value of $453. Local personal income would not change.

Wilderness Values

Naturalness

Overall, the Abert Rim WSA is in a natural condition. Vegetation in the WSA is in good condition and there is a variety of vegetative communities. The topography and vegetation help to mask any signs of human activity in the WSA. Although there are a number of man-made features in the WSA, they are mainly small, scattered, and not visible from a great distance.

The developments in the WSA include 14 reservoirs and waterholes, six guzzlers (small wildlife watering devices), three spring developments, and approximately six miles of vehicle ways. Total area influenced by these developments is approximately 1 percent of the WSA. There are several material storage sites and a gravel pit within the Highway 395 right-of-way which is outside the WSA.

The Colvin Timbers area was selectively logged in the 1950's. Scattered stumps and a few trails are all that remain of the logging activity. Many of the trails have overgrown to the point of not being locatable. Most of the Colvin Timbers area is covered with timber, numerous shrubs, and herbaceous species.

Naturalness of the rim edge, and below to Highway 395, can be affected at times by outside sights and sounds from traffic on Highway 395 and gravel operations along the highway. At times, these sights and sounds can be substantial; other times not at all. These sights and sounds can diminish the quality of wilderness for some people on the lower edges of the scarp face while reminding visitors on the upper slopes and edges of the rim of the benefits of wilderness isolation and limited access.

Opportunities for Solitude or Primitive and Unconfined Types of Recreation

Opportunities for solitude are excellent in the WSA, especially along the southern half of the area, both on the rim and along portions of the scarp. Here, deeply incised side canyons, foothills along the scarp, and vegetative screening all help to isolate the visitor. The northern half of the WSA (north of Mule Lake) and the portion along Highway 395 offer less solitude due to the narrowness of the WSA on top of the rim, the lack of isolating land form, the lower stature of vegetation, and proximity to the highway.

Primitive and unconfined types of recreation are abundant in the WSA. Hiking, backpacking, camping, sightseeing, photography, wildlife observing, horseback riding, and hunting opportunities are all excellent in the WSA. The visitor is rewarded with outstanding views, abundant wildlife, a variety of geological features, and a wide array of plants. Hiking can vary from flat, easy terrain on top to steep, rugged terrain on the scarps and canyons, such as along the Poison Creek Trail.

Special Features

Abert Rim is best known for being one of the largest continuous fault scarps in North America. The scarp, which shows little erosion, rises an average of over 2,000 feet above Lake Abert.

Abert Rim is a major scenic feature and landmark in the area and can be seen from both Highway 395 and Highway 31 for many miles. Highway 395 is a designated state scenic highway route. The WSA contains outstanding scenic qualities.

A portion of the WSA below the rim and along Highway 395 has been designated as an archeological district on the National Register of Historic Places. The area contains numerous archeological features. (The Cultural Resources section further discusses the archeological features.)

The WSA contains two plant species of special interest, *Rorippa Columbiae* (Columbia watercress) and *Penstemon glaucinus* (blue-leaved penstemon). (The plants are further discussed in the Vegetation section.)

Colvin Timbers, an isolated group of ponderosa pines on 600 acres, represents the northernmost extension of ponderosa pines in the Warner Mountains.

The WSA supports a herd of about 40 bighorn sheep which were introduced in 1974 to help perpetuate the species. The entire WSA provides bighorn sheep habitat, and the northern two-thirds of the river is an important nesting area for prairie falcons, golden eagles, great-horned owls and red-tailed hawks.

The WSA is used for both educational and scientific purposes by numerous geology and archeology students yearly. A number of archeological excavations have been conducted by universities for scientific purposes along the western boundary of the WSA.

Diversity in the National Wilderness Preservation System (NWPS)

According to the Bailey-Küchler system of classifying ecosystems, Abert Rim WSA is located in the Intermountain Sagebrush Province with a potential natural vegetation of saltbush-greasewood along the western edge and sagebrush steppe in the rest of the WSA. The area is adjacent to the ponderosa shrub forest-type to the south and includes a small portion of this community at Colvin Timbers.

Vegetative communities listed in the Basin and Range section of the Oregon Natural Heritage Plan occurring in the WSA are: ponderosa pine savanna, western juniper/big sagebrush/bluebunch wheatgrass, big sagebrush/bluebunch wheatgrass, big sagebrush-greasewood, big sagebrush-bitterbrush/Idaho fescue, bitterbrush-sagebrush-snowberry, low sagebrush/Sandberg's bluegrass, silver sage, big sagebrush-spiny hopsage, and mountain-mahogany.

Abert Rim is located within 5 hours' driving time of three standard metropolitan statistical areas with populations over 100,000: Eugene-Springfield and Medford, Oregon; and Redding, California.

Energy and Mineral Development

Energy and mineral resources were evaluated by BLM using available geologic data and data provided by TERRADATA, a consulting firm under contract with BLM. The data is contained in a report titled "Assessment of Geology, Energy and Minerals Resources of the Abert Rim Geologic Resource Area." The WSA is within the Abert Rim geologic resource area which has been classified according to a rating system that indicates both the potential for occurrence (geologic favorability) of certain minerals, as well as the quantity and quality of data on which the rating is based (confidence level). A description of the rating system is provided in the Statewide EIS volume.

Oil and gas and geothermal are the main energy resources with potential in the area. Because of above-normal heat flow and the presence of nearby thermal springs, there is a low moderate favorability for the occurrence of usable geothermal energy. Because of the likelihood of marine sedimentary rocks at depth, the area is considered to have a low favorability for the occurrence of oil and gas. However, there has been no deep drilling in this area.

There is a low favorability for the occurrence of diatomite and bentonite in the volcanic sedimentary rocks. However, these rocks are widespread and these commodities could occur in several areas. Based upon the proximity of two mineralized areas, and the fact that the Eugene-Denio Lineament crosses the WSA, the favorability for mercury, gold, and silver is considered to be moderate.

There is a moderate favorability for the occurrence of mercury and silver; both mercury and silver are strategic minerals, but there are no known deposits of strategic and critical minerals in the WSA.

Table 3 shows the mineral potential classifications for the WSA. Map 3 shows the portions of the WSA rated moderate (medium) for geothermal resources.

Mineral deposits adjacent to the WSA include a state highway road aggregate site. Mercury has been produced from the Lost Cabin (Windy Hollow) mining district in the Coyote Hills, approximately eight miles east of the WSA. In addition to Teritiary epithermal (low-temperature) mineralization in the Coyote Hills, evidence of similar mineralization is associated with rhyolitic rocks approximately two miles north of the WSA, but there is no record of mineral production.

There were no mining claims and no geothermal or oil and gas leases in the WSA as of January 1, 1984.

Table 3. Classification of Energy and Mineral Potential, Abert Rim (OR-1-101)

Commodity	Area	Classification Level	Confidence Level
Metals (gold, silver, mercury)	Entire WSA	3	B
Geothermal	See map 3	3	B
	Rest of WSA	2	B
Uranium/Thorium	Entire WSA	1	A
Coal	Entire WSA	2	B
Oil/Gas	Entire WSA	2	A
Limestone	Entire WSA	1	C
Bentonite	Entire WSA	2	B
Diatomite	Part of WSA (not shown on map)	2	B
Zeolites	Entire WSA	1	C

Legend:
Class 1 - Lack of indications of favorability
Class 2 - Low favorability
Class 3 - Moderate favorability
Class 4 - High favorability

Confidence Level A - Insufficient data or no direct evidence
Confidence Level B - Indirect evidence available
Confidence Level C - Direct evidence but quantitatively minimal
Confidence Level D - Abundant direct and indirect evidence

Surface rocks of the WSA are primarily continental Teritiary basalt flows and tuffaceous sedimentary rocks. The subsurface geology is largely unknown, but pre-Teritiary marine sedimentary rocks may exist at depth.

Vegetation

Vegetation in the WSA represents a wide variety of plant communities. Salt-desert shrub communities occur along the shores of Lake Abert grading into sagebrush/bunchgrass communities up the scarp. Stringers of aspen, mountain mahogany, and juniper occur with dense shrubs and bunchgrasses throughout portions of the southern half of the WSA. One stand of ponderosa pine (Colvin Timbers) covers approximately 600 acres. The northern portion of the WSA on top of the rim contains numerous low sagebrush communities.

The vegetative communities in the WSA vary from early seral in the big sagebrush communities along the base of the scarp along Highway 395 to climax condition in the big sagebrush/bluebunch wheatgrass communities at the top of the scarp. (Seral refers to a stage of ecological condition based on the difference between the present plant community and climax vegetation, the relatively stable, final stage in plant succession.) Most of the communities are probably in a mid-seral stage.

Two plant species of special interest (mentioned in the Special Features section) are known to occur within a few miles of the WSA: *Rorippa Columbiae* (Columbia watercress), which occurs along the shores of lakebeds north of the area, and *Penstemon glaucinus* (blue-leaved penstemon), which occurs to the south along rims in the timber country. Both plants are candidate species for federal listing as threatened or endangered

Wildlife

The southeastern quarter of the WSA (below the rim and south of Poison Creek) is crucial deer winter range for a small portion of the Crooked Creek deer herd. Depending upon the severity of the weather, two hundred to nearly a thousand deer use this portion of their range at some time during the winter.

The entire WSA is bighorn sheep range. The South Abert Rim bighorn sheep herd represents a very successful reintroduction that began in the mid-1970's. Currently, this herd numbers about forty to sixty head, but there is significant interchange with the parent population on Hart Mountain and with another small herd in the Grays Butte/North Abert Rim area. This northern herd appears to have been reestablished naturally from migrants coming from both Hart Mountain and South Abert Rim.

The basalt scarp of the northern two-thirds of the WSA (north of Juniper Creek) is an important raptor nesting area. Prairie falcon densities average about one eyrie (nest) per mile of rim and golden eagle nests average about twice that. Throughout this portion of the rim, there are also nesting sites of great-horned owls and redtailed hawks.

The WSA is habitat for numerous other species of birds and mammals, including deer, antelope, cougar, bobcat, coyotes, badgers, hawks, lizards, snakes, songbirds, upland game birds, flycatchers, and numerous other species. There is a wide variety of animals in the WSA due to a diversity of vegetative communities and topographic features and few developments in the area.

Currently, there are six guzzlers within the WSA. Four of the guzzlers are located on the scarp and two on the rim.

Livestock Grazing

Portions of five grazing allotments are within the Abert Rim WSA. Table 4 shows existing livestock

Table 4. Existing Livestock Use, Abert Rim WSA (OR-1-101)

Allotment	Licensed AUMs in Allot.	Period of Use	Percent of Allot. in WSA	Current Actual Use in WSA (AUMs)
Abert Seeding (No. 0522)	2,619	6/16-01/20	5.0	131
FRF Fitzgerald (No. 0502)	346	3/01-02/28	2.5	9
Clover Creek (No. 0518)	435	6/01-11/01	22.9	100
Coyote-Colvin (No. 0517)	5,091	3/16-12/15	9.2	468
Paisley Common-Abert Rim[1] (No. 0400)	19,124	None		0
Total	27,615			708

[1] Based on only the area in the Abert Rim pasture. Paisley Common pasture in the WSA has no allocated livestock grazing. The only livestock use in this pasture, which consists of most of the scarp area, is by trailing livestock (moving livestock from one area to another).

use in AUMs (animal unit months, the amount of forage needed to sustain one cow and a calf, or equivalent animals, for one month). The Paisley Common allotment is large with individual pastures which are widely separated.

Existing livestock projects in the WSA (among the the man-made features mentioned in the Naturalness section) include 14 reservoirs and waterholes and 3 spring developments.

Two livestock projects, a spring development and a reservoir are proposed for the WSA, south of Mule Lake. These proposed water developments would enhance livestock distribution and allow improved management; no reduction in AUMs would be made in their absence.

Vehicles are occasionally used in the WSA to inspect livestock and for salting. Livestock in the area are gathered by horseback.

Wood Products Harvest

There are 600 acres of commercial forest land containing three million board feet of ponderosa pine in the Colvin Timbers, along the boundary in the southern end of the WSA. The area is excluded from planned timber harvest, but could be partially cut as part of a mortality-salvage program during insect or disease infestations. Existing access roads into the area are badly washed out and would need extensive reconstruction or relocation prior to logging.

Cultural Resources

The Abert Rim WSA contains a wide variety of cultural sites. Shoreline sites as well as upland sites occur in the WSA. Common sites include lithic scatters, villages with housepits and stone shelters, burials, rock art sites, campsites, hunting blinds and rock cairns. Portions of the WSA south of the archeologic district have been nominated for inclusion on the National Register, because of the numerous high quality archeological sites in this area.

Recreation Use

Due to the spectacular scenery along Abert Rim, sightseeing from the highway right-of-way is the most common, generally passive, type of recreation related to the WSA. Hunting is the most common recreation activity within the WSA. Other recreation activities include hiking, camping, nature study, photography and hang gliding. Most recreation use in the WSA is not vehicle-oriented. The vehicle ways in the WSA and roads leading to it are very rough, so most vehicle use is limited to the boundary roads and a few trails inside the WSA.

Hunting by horseback or on foot is more practical and is the method most used for hunting in the area. Hunting of upland game birds, deer, and antelope is common in the WSA. A few bighorn sheep tags are issued each year, offering the Oregon hunter a once in a lifetime experience.

Abert Rim is considered by hang gliders to be one of the most spectacular and challenging sites in Oregon. Access is very limited, and the gliders must be hand carried to the edge of the rim from the WSA boundary road. Hang gliding use is low. The Poison Creek Trail, which runs from Highway 395 near the west boundary to the top of the rim, receives moderate recreation use.

Recreation use (hunting, hiking, fishing, and camping) is very high in the Fremont National Forest just south of the WSA. The ruggedness of the road in this area prevents extensive use by the public of the area north of the Forest Service boundary (toward the WSA).

Economic Value and Local Income

Livestock grazing and recreation are the only resource outputs which generate economic activity in this WSA. The WSA currently produces 708 animal unit months (AUMs) of livestock forage and an unknown amount of recreation activity annually. As of January 1, 1984, there were oil and gas leases or geothermal leases on the WSA.

Economic value of existing outputs amounts to $5,338 annually, and local personal income generated by existing outputs amounts to $7,271 annually. The terms economic value and local personal income are discussed in the Statewide EIS volume.

Environmental Consequences

This section discusses the environmental consequences of implementing each of the alternatives. Resources and activities not significantly affected by any of the alternatives are not discussed. General impact conclusions applicable to all WSAs, including impact conclusions based on speculative future developments (developments which are possible, but are not currently proposed), are discussed in the Statewide EIS volume. That volume also discusses certain assumptions that were made for this analysis.

Effects on Wilderness Values

The **all wilderness alternative** would add 23,280 acres to the National Wilderness Preservation System (NWPS). It would preserve wilderness characteristics in the entire WSA, including the rugged, steep slopes of the largest continuous fault scarp in North America, Abert Rim. Some of the scenery for which Highway 395 was named an Oregon State scenic route would also benefit. Lake Abert archeological district and the abundant archeological sites would be protected from development.

The all wilderness alternative would preserve the high quality bighorn sheep and raptor habitat in a relatively undisturbed state. Vegetative diversity, which supports abundant wildlife species, would be maintained.

The Colvin Timbers, an isolated stand of ponderosa pine, would be protected from possible salvage logging. Wilderness designation would maintain excellent recreation and opportunities for solitude. Closure of 6 miles of ways would enhance wilderness values.

Under the **no wilderness/no action alternative**, possible mineral development could adversely affect wilderness quality in the entire WSA. The lower slopes around Lake Abert could be adversely affected by possible geothermal development. Colvin Timbers would be subject to possible salvage logging, increased amount or roads, and other disturbances. Bighorn sheep habitat could be adversely affected by mining and geothermal development.

Naturalness and solitude could be reduced on the scarp by possible road developments, stockpiling of gravel, and possible mining and geothermal development. Scenic qualities would also be adversely affected.

Effects on Energy and Mineral Development

Areas designated wilderness would be withdrawn from mineral exploration and development. Under the **all wilderness alternative**, 23,280 acres would be withdrawn. This would include the area rated moderate for mercury, gold, and silver, which encompasses the entire WSA, and the 1,500-acre portion rated moderate for geothermal.

No acreage would be withdrawn under the **no wilderness/no action alternative**.

Effects on Vegetation

Areas designated wilderness would not be subject to most surface disturbing activities. Vegetation dependent upon the existing undeveloped environment would thus be maintained under the **all wilderness alternative**.

The **no wilderness/no action alternative** would allow for the possibility of mortality-salvage logging in the Colvin Timbers. Removal of older age classes, if it occurs, would accelerate natural succession. The two federal candidate species of special interest suspected to occur in the WSA would receive the same protection as federally listed threatened or endangered species.

Effects on Wildlife

Wildlife habitat would be preserved under the **all wilderness alternative**.

Under the **no wilderness/no action alternative**, primary and secondary cavity nesting species could be adversely affected by logging of mature trees in Colvin Timbers. Primary and secondary cavity nesting species require mature trees for nesting and habitat. Such species include woodpeckers, owls, bluebirds, tree swallows, flickers, yellow-bellied sap suckers, nuthatches, squirrels, and yellow-pine chipmunks. Redtailed hawks which use the Colvins for nesting would also be adversely affected.

Improvement of roads associated with possible logging activity would increase visitor use to the detriment of the wildlife in this area, particularly bighorn sheep.

Effects on Livestock Grazing

In the **all wilderness alternative**, there would be very little effect on existing livestock grazing. The two water developments, designed to improve livestock distribution might or might not be allowed under the all wilderness alternative, depending on a site-specific analysis to determine if they conform to the Wilderness Management Policy. If not allowed, there would be continued improper livestock distribution. Reduced vehicle use due to closure of ways would cause only a minor inconvenience to livestock operators, as much of the current management is by horseback.

Under the **no wilderness/no action alternative,** the two water developments would improve livestock distribution and management in the allotment. Livestock operators could continue using vehicles for salting and inspecting livestock.

Effects on Wood Products Harvest

Under the **all wilderness alternative**, the Colvin Timbers (600 acres) would not be cut as a mortality-salvage during insect or disease infestations unless considered necessary to protect timber outside the area. Such logging could occur under the **no wilderness/no action alternative**.

Effects on Recreation Use

Under the **all wilderness alternative**, primitive recreation values, particularly hunting, would be enhanced by eliminating vehicles. Most of the current recreational activities in the WSA, including hunting, are not vehicle-oriented. Some inconvenience could occur to hunters excluded from vehicle ways in the WSA. Hang gliding activity would be prohibited under wilderness management. Primitive recreation use in the WSA could increase due to increased recognition of the primitive recreation potential of the area. Overall recreation use would accelerate.

Under the **no wilderness/no action alternative**, the quality of primitive recreation would continue to be adversely affected by vehicle-oriented recreation. With possible increases in vehicle access as a result of road upgrading for logging, primitive recreation opportunities could be adversely affected while vehicle-oriented recreation use would increase. If destruction of wildlife habitat were to occur through developments in the WSA, hunting related recreation activities could decrease. Any logging of Colvin Timbers would have an adverse effect on primitive recreation associated with nature study and camping.

Negligible change in overall recreation use of the WSA is expected under the no wilderness/no action alternative.

Effects on Economic Value and Local Income

The economic effects for the alternatives are presented in tables 5 and 6. Table 5 shows the effects on economic value and table 6, the effects on local personal income. It is not known at this time whether individual proposed structural developments, such as the reservoir and spring proposed for this WSA, would be constructed if the area were designated wilderness.

The column for the all wilderness alternative shows

Table 5. Effects of Alternatives on Annual Economic Value, Abert Rim WSA (OR-1-101) (1981 price levels)

Item	Unit of Measure	All Wilderness	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS			
Grazing:			
Investment[1]	AUM	0	0
VALUE OF PLANNED INVESTMENTS[2]			
Grazing	$	0	0
Investments[3]	$	-453 to 0	-453
Net Economic Values[4]	$	-453 to 0	-453
VALUE OF OTHER EXPECTED CHANGES IN OUTPUTS			
Reduced access[5]	$	-37	0
VALUE OF TOTAL EXPECTED CHANGES IN OUTPUTS			
All categories	$	-490 to -37	-453

[1] Expected future increases due to range improvement investments.

[2] Expenditures for structural projects involving up to $5,620, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

[3] Average annual cost of investment expenditures amortized at 7.875% over 50-year period.

[4] For alternatives reflecting a range of negative net values (i.e., investment costs exceeding benefits), the figures are reversed to show the larger negative value as the lower end of the range (e.g., -20 to 0) so that the summation of effects all categories in each column will show the full range of potential effects.

[5] Additional cost (shown as negative value) due to restriction of vehicular access for livestock operator.

Table 6. Effects of Alternatives on Local Personal Income, Abert Rim WSA (OR-1-101) (1981 price levels)

Item	Unit of Measure	All Wilderness	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS			
Grazing:			
Investment[1]	AUM	0	0
INCOME FROM PROPOSED INVESTMENTS[2]			
Grazing	$	0	0
Construction activity[3]	$	0 to $695	$695
Total[4]	$	0	0

[1] Expected future increases due to range improvement investments.

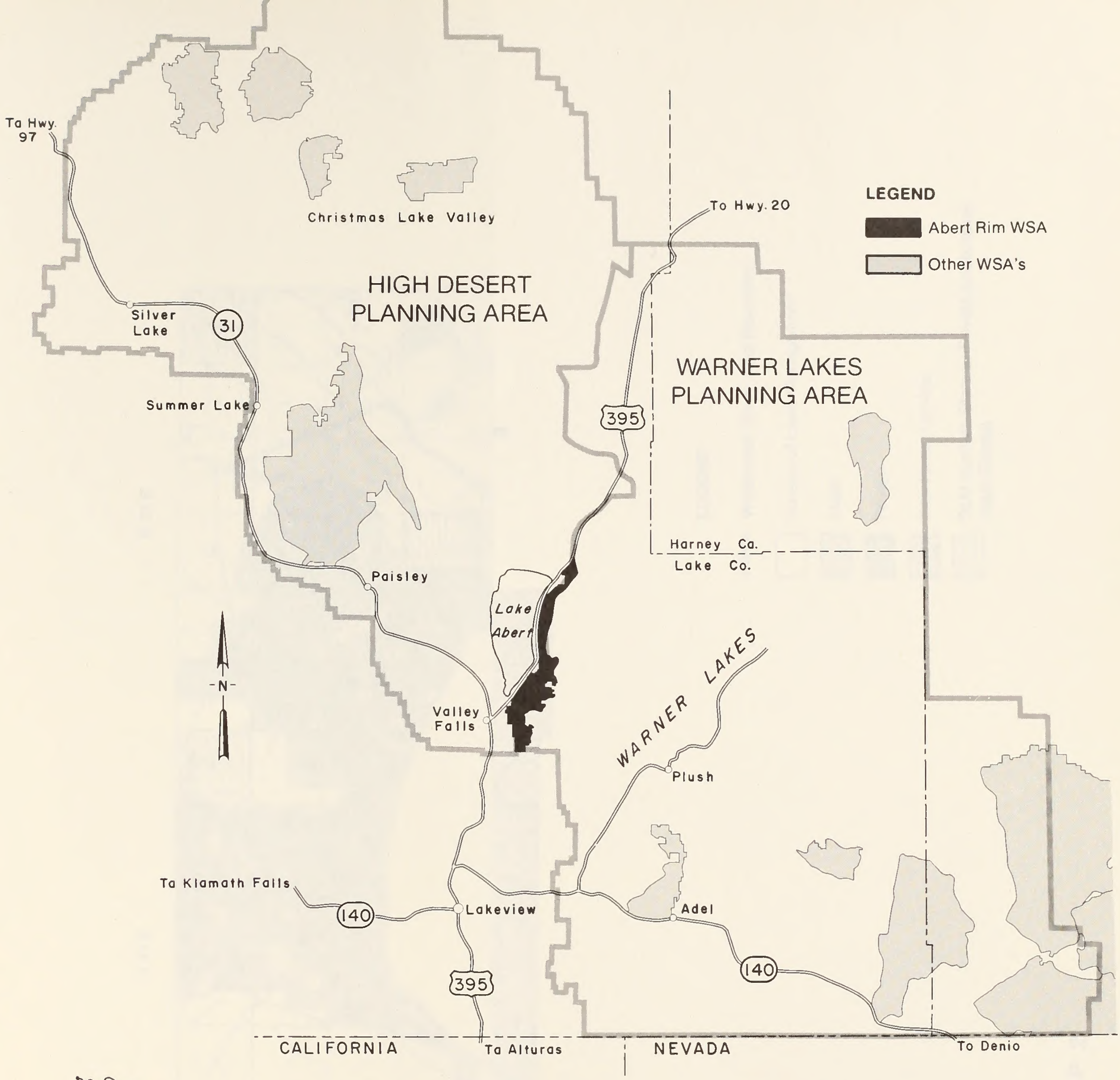
[2] Expenditures for structural projects involving up to $5,620, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

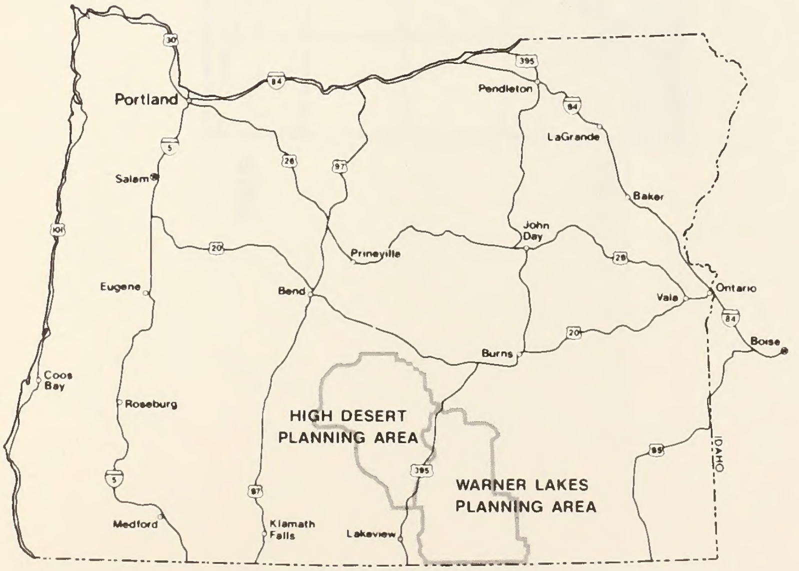
[3] Local personal income generated annually during assumed 5-year construction period. This amount cannot be added to the income resulting from grazing and hunting activity because it is not sustained over the analysis period.

[4] Detail may not sum to "Total" due to rounding. Total omits income from construction which is limited to 5-year period. See footnote 3.

the effects as a range of values dependent upon whether structural improvements and/or grazing operator access were allowed.

Currently, there is little dependence on vehicles for livestock management in the study area. The all wilderness alternative would restrict such vehicle use unless there were no practical alternative. The maximum impact from road closures upon the grazing operator in the WSA would be an increase in cost of about $37 per year.





U. S. Department of the Interior
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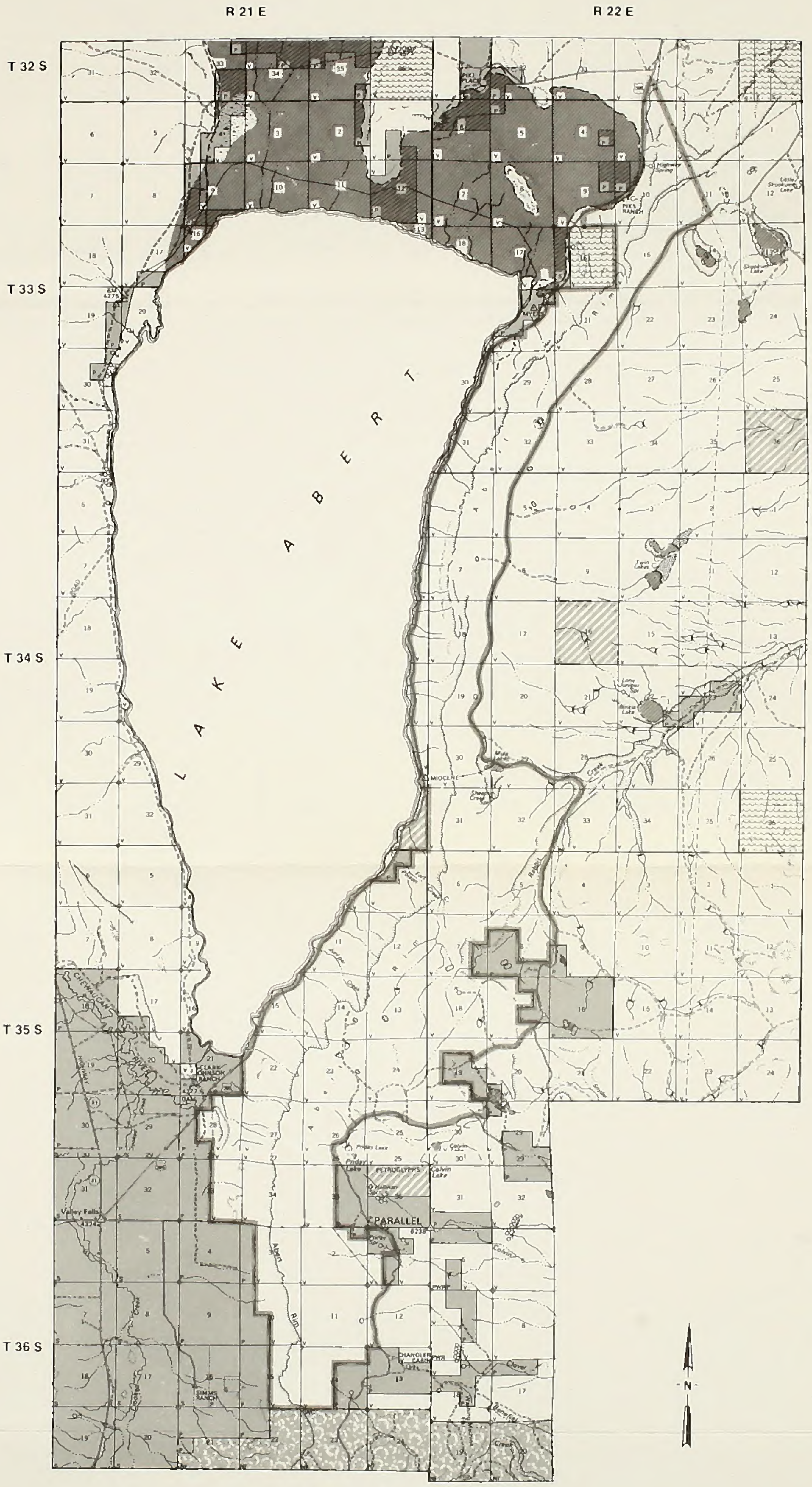
Lakeview District

Abert Rim WSA
OR-1-101

LOCATION MAP

10 0 10 MILES

MAP 1



U. S. Department of the Interior
Bureau of Land Management
Lakeview District

Abert Rim WSA
OR-1-101

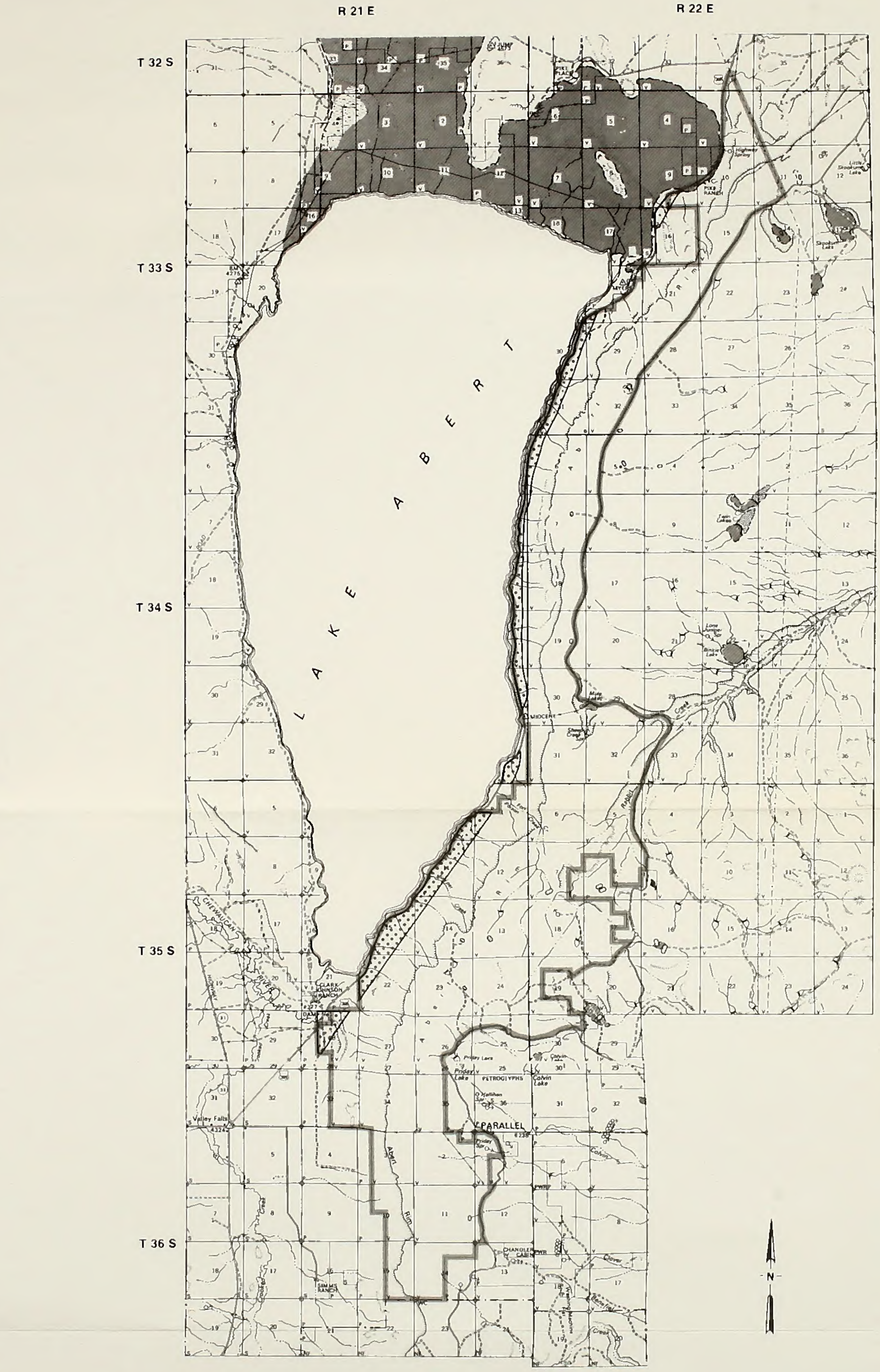
LAND OWNERSHIP

1 0 1 2 MILES

LEGEND

- ▬ Wilderness Study Area Boundary
- ☐ Bureau of Land Management
- ▨ State
- ▩ Private
- ▒ U.S. Forest Service
- ▤ BLM Surface-State or Private Subsurface (Split Estate)

MAP 2



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Lakeview District

Abert Rim WSA
OR-1-101

MEDIUM OR HIGH POTENTIAL MINERAL OR ENERGY RESOURCES

▨ **Medium Potential (3B) for Geothermal Resources**

Entire WSA:
Medium Potential
(3B) for Mercury, Gold and Silver

MAP 3

Abert Rim WSA, OR-1-101. Abert Rim and Abert Lake from the rim near Juniper Creek. Within the area recommended suitable under the preferred (all wilderness) alternative. Illustrates vegetative cover and typical view from the south part of the rim. July 1980.

Abert Rim WSA, OR-1-101. Looking south about half-way up Abert Rim near Poison Creek. Within area recommended suitable under the preferred (all wilderness) alternative. Terrain typical of the south end of Abert Rim. September 1982.

Appendix to the Wilderness Environmental Impact Statement for Oregon

Fish Creek Rim Wilderness Study Area (OR-1-117)

General Description of the Study Area

Fish Creek Rim wilderness study area (WSA) is located immediately north of the town of Adel, Oregon, on State Highway 140, thirty miles east of Lakeview, Oregon (see map 1). Roughly crescent-shaped, the WSA extends some ten miles north of Adel along the Fish Creek Rim, and varies in width from 1/2 to 5 1/2 miles.

The WSA contains 16,070 acres, all of it public land (see map 2). Boundaries are defined by state and private lands on the north and east, mostly by a BLM road on the west and by State Highway 140 on the south. East of the WSA, most land ownership is private; lands west of the WSA are mostly BLM. The east side roughly parallels the highway between Adel and Plush. Primary use of the area is for livestock grazing, wildlife habitat, and recreation.

The primary feature of the WSA is the east-facing scarp of Fish Creek Rim, which rises 1,500 to 2,000 feet above the Warner Valley to the east. The area west of the rim is known as Monument Flat. This area is primarily a low sagebrush and juniper flat sloping westward from the rim. The part of the WSA just west of the rim, in the central and north portions, contains minor broken rims trending north west to southwest. South of this broken terrain, the WSA is open, low sagebrush country. The southwest corner of the WSA contains Sweeney Canyon which drains south into the Deep Creek Canyon.

Vegetation includes dense stands of mountain mahogany, small aspen groves, and scattered junipers west of the rim with considerable juniper cover on the east face. A small stand of white fir and low sagebrush grow on the western and southern portions of the WSA.

There is a microwave relay tower on the rim at the end of a dead-end road extending into the southeast corner of the WSA from Deep Creek. The microwave site and road form part of the WSA boundary. (An abandoned access road to the tower across Monument Flat from a boundary road of the WSA has been closed.)

Interrelationships

There are no significant interrelationships between the Fish Creek Rim WSA and other WSAs, other special management area designations, or programs administered by other agencies.

Issues

Issues relating to each WSA were raised by BLM and the public during the wilderness inventory and EIS planning and scoping process. These issues concern both the effects of wilderness designation on existing and potential land uses or resources in the WSA, as well as the effects of existing and potential land uses or resources on wilderness values. Land uses or resources raised as issues specifically for this WSA include:

- the Known Geothermal Resource Area (KGRA, a federally defined area within which geothermal resources are known to exist) in the WSA,
- private land adjacent to the WSA (effects of wilderness designation on private land are discussed in the statewide EIS volume),
- vehicle-oriented sightseeing,
- operation of the microwave tower on the south end of the WSA (there would be no impacts under any alternative), and
- management of the deer herd in the area.

Also raised as an issue was whether designations other than wilderness could protect the features of the rim. (It is beyond the scope of this EIS to address management options for the no wilderness/no action alternative other then continuation of currently planned management.)

Description of the Alternatives

The following alternatives are analyzed:

- all wilderness
- enhanced wilderness
- partial (preferred alternative)
- no wilderness/no action

All Wilderness

The all wilderness alternative would recommend all 16,070 acres of public land in the WSA suitable as wilderness (see map 2). The service road to the microwave tower would remain open.

Enhanced Wilderness

The enhanced alternative would recommend 15,740 acres of public land suitable as wilderness (see map 3). In addition, an attempt would be made to acquire about 600 acres of split-estate land (federally managed surface, state or privately owned subsurface mineral rights) and about 400 acres of private land adjacent to the WSA boundary in the north half. These lands could be acquired by purchase or exchange with willing owners. Assuming acquisitions of these parcels, total area recommended suitable under this alternative would be 16,740 acres.

With acquisition of the adjacent parcels, the northwest boundary of the area recommended suitable would follow a BLM road entirely instead of partly following legal subdivisions.

Some 330 acres would be recommended as nonsuitable for wilderness on the south end of the WSA. The border would follow the access road from Highway 140 to the microwave facility and a powerline that services the facility. The nonsuitable portion contains a number of rights-of-way paralleling Highway 140 and, due to the presence of traffic on the highway, has limited opportunities for solitude or primitive recreation.

Partial (Preferred Alternative)

The partial alternative would recommend 11,300 acres of public land suitable as wilderness (see map 4). In addition, an attempt would be made to acquire the adjacent 600-acre parcel of split-estate land along the west boundary. This parcel could be acquired through purchase or exchange with willing owners. Assuming acquisition of this section, total area recommended suitable under this alternative would be 11,900 acres.

The north boundary of the suitable area would be along a way extending eastward from the west boundary of the WSA near Clelland Spring to Fish Creek Rim and then northwesterly on a way along the rim to the northeast boundary of the WSA. The south boundary would follow the closed access road to the microwave site and a powerline from the microwave site to the southeast boundary of the WSA. On the southeast, the boundary would follow the 4,800-foot contour for approximately one-quarter mile between two private parcels. Acreage recommended nonsuitable as wilderness east of this line is part of a proposed livestock forage seeding near the Plush/Adel highway.

A total of 4,770 acres would be recommended as nonsuitable for wilderness.

No Wilderness/No Action

The no wilderness/no action alternative would recommend the entire WSA nonsuitable as wilderness. It represents the situation most likely to occur without wilderness designation. The area would be managed according to the current land use plan, which includes the following features relevant to this analysis:

- continued availability for mineral exploration and development,
- implementation of wildlife improvement projects, including water developments and vegetative manipulation (burn-and-seed),
- implementation of livestock improvement projects, including a reservoir, fencing, and vegetation manipulation (burn-and-seed, seeding), and
- harvesting of juniper for fence posts or firewood on 2,160 acres, if demand warrants it.

Table 1 summarizes the proposed management of the WSA under each alternative.

Table 2 summarizes the environmental consequences of each alternative.

Manageability of the Area as Wilderness

The WSA is manageable as wilderness. However, outside sights and sounds would cause management problems near the south boundary above Highway 140. If private and split-estate land adjacent to the north end of the WSA were developed, wilderness values in the wilderness area could be adversely affected.

The enhanced wilderness alternative would substantially improve manageability of the area with acquisition of the split-estate section and private lands in the north part of the WSA. This would preclude the possibility of future developments on the acquired lands. The boundary would be physically established and well defined on a bladed road.

Table 1. Summary of Proposed Management Under Each Alternative, Fish Creek Rim WSA (OR-1-117)

Proposed Management	All Wilderness	Enhanced Wilderness	Partial	No Wilderness/ No Action
Acres Designated as Wilderness	16,070	15,740	11,300	0
Acres Closed to ORVs by Wilderness Designation	16,070	15,740	11,300	0
Miles of Ways Closed	4	6	3	0
Acres of Full Fee Estate Acquired	0	400	0	0
Acres of Split Estate Acquired	0	600	600	0
Acres Withdrawn from Mineral Location and Leasing by Wilderness Designation	16,070	15,740	11,300	0
Vegetative Manipulation for Wildlife: Brush Control with Seeding (acres)	0	0	200	200
Structural Livestock Projects Developed:				
Reservoirs & Waterholes (number)	0-1	0-1	0-1	1
Fences (miles)	0-1	0-1	0-1	1
Vegetative Manipulation for Livestock: Brush Control with Seeding (acres)	0	0	400	800
Acres of Suitable Minor Forest Products Available for Harvest	0	440	1,560	2,160

The area recommended suitable under the partial alternative would be fully manageable as wilderness because it would eliminate most potential conflicts conflicts from development of adjacent private land.

Rationale for the Selection of the Preferred Alternative

The partial alternative is preferred because the benefits of preserving wilderness values in the portion recommended as suitable for wilderness would outweigh the benefits of development for livestock and minerals. Areas recommended as nonsuitable for wilderness have potential for development of livestock grazing projects, utilities, and minerals, and the benefits of such developments would outweigh the benefits of preserving wilderness values in those portions of the WSA. The portion recommended as suitable for wilderness has more wilderness values than the portion recommended as nonsuitable.

Table 2. Summary of Environmental Consequences of Alternatives, Fish Creek Rim WSA (OR-1-117)

Resource or Activity	All Wilderness	Enhanced Wilderness	Partial (Preferred Alternative)	No Wilderness/No Action
Wilderness Values	Would add 16,070 acres to NWPS. Preserve native vegetation, rare plant sites, habitat for big-horn sheep, peregrine falcons. Scenic features of the rim preserved. Primitive recreation potential preserved. Closure of 4 miles of ways would enhance naturalness and opportunities for solitude and primitive recreation. Area would be manageable as wilderness.	Would add 16,740 acres to NWPS assuming adjacent split-estate and private lands could be acquired. Benefits similar to all wilderness. Area would be manageable as wilderness. Closure of 6 miles of ways would enhance naturalness and opportunities for solitude and primitive recreation.	Would add 11,900 acres to NWPS, assuming acquisition of split-estate land. Preserve key area of Fish Creek Rim in natural condition. Most vegetative communities would remain natural. Some loss of primitive recreation potential. Closure of 3 miles of ways would enhance naturalness and opportunities for solitude and primitive recreation. Area would be manageable as wilderness. Livestock and antelope forage projects, and geothermal and mineral development could adversely affect wilderness values in area recommended nonsuitable.	Entire WSA recommended non-suitable as wilderness. Area would be open to geothermal and mineral development with possible loss of potential peregrine falcon, bighorn sheep, and other wildlife habitat, scenic values. Native communities altered and naturalness reduced on 1,000 acres in vegetative manipulation projects. Opportunities for solitude and primitive recreation could be reduced.
Energy and Mineral Development	Development precluded on 16,070 acres, including 16,070 acres with moderate potential for metals, 4,480 acres with high potential for geothermal and 2,660 acres with moderate potential for diatomite.	Development precluded on 15,740 acres, plus an additional 1,000 acres if acquired. Includes 15,740 acres with moderate potential for metals, 3,240 acres with high potential for geothermal and 1,760 acres moderate potential for diatomite.	Development precluded on 11,300 acres, plus an additional 600 acres if acquired. Includes 11,300 acres with moderate potential for metals, 3,400 acres with high potential for geothermal and 1,040 with moderate potential for diatomite.	No impact.
Vegetation	Vegetation would be preserved.	Same as all wilderness.	Vegetation preserved in suitable area. Vegetation diversity on 200 acres reduced by proposed vegetative manipulation in nonsuitable area.	Vegetation diversity on 1,000 acres reduced by proposed vegetative manipulation.
Wildlife	Wildlife habitat preserved. Precludes 200-acre burn-and-seed to improve antelope forage, but animal numbers not affected. Might preclude installation of a guzzler designed to improve antelope habitat. No significant impact.	Same as all wilderness.	Wildlife habitat preserved in suitable area. Proposed guzzler in suitable area might be precluded. 200-acre burn-and-seed to improve antelope forage allowed in nonsuitable area. No significant impact.	200-acre burn-and-seed and guzzler would be implemented, improving antelope habitat and distribution. No significant impact.
Livestock Grazing	164 AUM potential increase foregone. Minor impact on livestock management. Reservoir and fence might be precluded if not built, opportunity to better distribute livestock foregone.	Same as all wilderness.	Potential increase of 81 AUMs foregone. Most existing developments open tovehicle access. Reservoir and fence might be precluded if not built, opportunity to better distribute livestock foregone.	No impact to livestock grazing. Potential increase of 164 AUMs realized. Reservoir and fence allowed, realizing opportunity to better distribute livestock.
Wood Products Harvest	Precludes harvest of juniper on 2,160 acres. Demand could be met elsewhere.	Precludes harvest of juniper on 1,720 acres. Demand could be met elsewhere.	Precludes harvest of juniper on 600 acres. Demand could be met elsewhere.	No impact.
Economic Value and Local Income	Decrease in annual economic value could range from $1,167 to $44, depending on what proposed projects would be allowed in wilderness. Local personal income would not change. Excludes unknown economic effects of mineral development and unquantified changes in recreation use. The maximum increase in transportation costs to ranchers with grazing permits would be $44.	Same as all wilderness.	Changes in annual economic value could be a loss of as much as $982 or an increase of as much as $141, depending on what proposed projects would be allowed in wilderness. Local personal income would increase by $852. Excludes unknown economic effects of mineral development and unquantified changes in recreation use. The maximum increase in transportation costs to ranchers with grazing permits would be $44.	Decrease in economic value by $1,915 and increase in local personal income by $1,684 from construction of proposed projects.

Affected Environment

This section discusses only those activities or resources which influence the character of the study area, or that may be affected by the alternatives.

Wilderness Values

Naturalness

The majority of the WSA is natural in appearance. Topography and vegetation have either prevented development in the area or mask the development that has occurred. The dense groves of mountain mahogany and stands of juniper contribute to the natural appearance.

The WSA contains 22 small water developments; however, the small size and distribution of the developments renders them unnoticeable in the area as a whole. Many of these small waterholes are difficult to locate on the ground and are well screened. The WSA contains some four miles of fence, three miles near Sweeney Canyon, which is screened by sagebrush, and one mile in the central part of the WSA that runs through a mahogany thicket. Four miles of ways (a vehicle route established and maintained solely by the passage of vehicles) in the area are unnoticeable except along the routes.

The closed route to the microwave site has also grown over to the extent that it is not noticeable from any distance. A short section of powerline below the rim which supplies the microwave site is adjacent to private land at Crump Ranch. A small antenna east of Clelland Springs provides television service to the town of Plush. This antenna is visible for only a few hundred yards, as it is screened by trees.

These man-made features influence less than 2 percent of the WSA. (The area of influence is an estimate based on the acreage in the WSA from which these man-made features can be seen.)

Outside sights and sounds affecting the WSA are the microwave site on the south end of the WSA (this is a right-of-way at the end of a dead-end road forming part of the boundary of the WSA and not considered inside the WSA), and a 750-kV powerline, the access road for which forms the southwest boundary of the WSA. The powerline has a minor impact on the WSA for approximately 1/2 mile east along its length. The microwave tower is visible from the low sagebrush flat on the south end of the WSA, but has no substantial impact on the naturalness of the WSA as a whole. The scale of the tower in proportion to its surroundings make it inconspicuous at any distances over 1/2 mile, and it is screened from view on all but a small part of the WSA.

Opportunities for Solitude or Primitive and Unconfined Types of Recreation

Opportunities for solitude are outstanding on all portions of the WSA with the exception of the low sagebrush flat area adjacent to the boundary road in the southern part of the area. Topography or vegetation readily screens the visitor from others in the area on all but this very open country. Even on the flats, the size of the WSA offers effective screening for a reasonable degree of solitude.

A relatively high traffic volume (average 240 vehicles per day) on Highway 140 subjects the portion of the rim facing Deep Creek on the south to considerable traffic noise, especially as heavy vehicles (trucks) use the highway. Public comments during the study suggested the Plush/Adel highway has a similar impact on the study area; however, the traffic volume is much less (about 13% of Highway 140 traffic) and this road is not used by interstate trucks.

Primitive recreation opportunities are outstanding in the WSA. Hiking terrain varies from very easy to extremely rugged, with the most interesting opportunities along the rim, and below, to the east. Many good camping areas are located just west of the rim top in mahogany groves and aspen groves. Sightseeing for mammals, birds, plants and geologic features is outstanding. The area also contains significant rock art sites for study of cultural history.

The scenery in the WSA is outstanding and the area offers magnificent views of the Warner Valley and desert to the east, as well as west towards Drakes Peak and the Fremont National Forest. The area also offers excellent hunting opportunities for deer and antelope.

Special Features

Fish Creek Rim is one of a series of steep fault block scarps which formed the basin and range topography of much of southeastern Oregon. It is a major scenic landmark.

The Fish Creek Rim WSA contains a plant species of special interest, *Melica stricta* (strict onion grass), which is very uncommon in the Lakeview District. (This plant is further discussed in the Vegetation section.)

A small group of white fir on the rim is unique in that the main fir population in the Warner Mountains ends some 12 to 14 miles west of this location. The mountain mahogany stands on Fish Creek Rim are some of the largest and best quality stands within the basin and range province in Oregon.

Most of the WSA is located in crucial deer winter range. Bighorn sheep have been spotted several times on the rim. The rim is a high-density nesting area for many species of raptors.

A contract study has identified one site inside the WSA as an excellent location for potential reintroduction of peregrine falcons to their original range. A second excellent site is located just north of the WSA northern boundary. In the Oregon state priority of the Pacific State Peregrine Falcon Recovery Team, this location is second to Crater Lake National Park, where falcons have already been reintroduced. The team will make final recommendations after pesticide residue studies on prey species in the area have been completed.

The WSA contains cultural resource sites with rock art, hunting blinds, and at least one prehistoric bighorn sheep hunting complex.

Diversity in the National Wilderness Preservation System (NWPS)

According to the Bailey-Küchler system of classifying ecosystems, the Fish Creek Rim WSA is located in the Intermountain Sagebrush Province with a potential natural vegetation of sagebrush steppe. Vegetation communities listed in the Basin and Range section of the Oregon Natural Heritage Plan which occur in the WSA are: mountain mahogany communities, aspen groves, low sagebrush/Idaho fescue, big sagebrush/bitterbrush/Idaho fescue and big sagebrush/bluebunch wheatgrass.

The WSA is within 5 hours' driving time of the following standard metropolitan statistical areas with population over 100,000: Medford, Oregon; Redding, California; and Reno, Nevada.

Energy and Mineral Development

Energy and mineral resources were evaluated by the BLM using available geologic data and data provided in a report by TERRADATA, a consulting firm under contract with BLM. The report is titled "Assessment of Geology, Energy, and Minerals Resources of the Crump Lake Geologic Resource Area."

The WSA is within the Crump Lake geologic resource area which has been classified according to a rating system that indicates both the potential for occurrence (geologic favorability) of certain minerals, as well as the quantity and quality of data on which the rating is based (confidence level). A description of the rating system is provided in the Statewide EIS volume.

Oil and gas and geothermal resources are the two main potential energy resources that may be present. The portion of the WSA within the Crump Geyser Known Geothermal Resource Area on and east of the rim, is rated highly favorable for the occurrence of geothermal energy. No known hydrocarbon shows exist near the WSA, but oil-bearing marine sedimentary rocks may be present at depth. Favorability for the occurrence of oil and gas is considered to be low.

There is a moderate favorability for the occurrence of diatomite in the tuffaceous sedimentary rocks. The favorability for the occurrence of diatomite is based upon the presence of volcanic sedimentary rocks that, in other places, contain ashy diatomite. Even though the potential for diatomite is moderate, diatomite occurs in several other areas in Oregon, and formations that may contain diatomite are widespread.

There is a moderate favorability for the occurrence of mercury, silver and gold. The basis for this rating is the assumption that hydrothermal systems may have been active in the geological past, as they are today in this area, and that deposits of gold, silver, and mercury may be associated with hydrothermal mineralization. Mercury and silver are strategic and critical minerals; but there are no known deposits of strategic and critical minerals in the WSA.

Table 3 shows the minerals potential classifications

Table 3. Classification of Energy and Mineral Potential, Fish Creek Rim WSA (OR-1-117)

Commodity	Area	Classification Level	Confidence Level
Metals (gold, silver, mercury)	Entire WSA	3	B
Geothermal	See map 5	4	D
	Rest of WSA	2	B
Uranium/Thorium	Entire WSA	1	A
Coal	Entire WSA	2	B
Oil/Gas	Entire WSA	2	A
Limestone	Entire WSA	1	C
Bentonite	Entire WSA	1	A
Diatomite	See map 5	3	B
	Rest of WSA	1	B
Zeolites	Entire WSA	2	B

Legend:
Class 1 - Lack of indications of favorability
Class 2 - Low favorability
Class 3 - Moderate favorability
Class 4 - High favorability

Confidence Level A - Insufficient data or no direct evidence
Confidence Level B - Indirect evidence available
Confidence Level C - Direct evidence but quantitatively minimal
Confidence Level D - Abundant direct and indirect evidence

for the WSA. Map 5 shows the portions of the WSA rated moderate (medium) for diatomite and high for geothermal. The latter area coincides with the boundary of the KGRA.

Except for road aggregate sources along the southern and eastern boundaries of the WSA, there are no known mineral deposits. As of January 1, 1984, there were no mining claims and no oil and gas or geothermal leases in the WSA.

The rocks of the WSA are Tertiary basalt flows, tuffs, and tuffaceous sedimentary rocks, and Quaternary to Tertiary wind- and water-lain sediments and landslide debris. The Tertiary rocks are exposed along the Fish Creek Rim fault block. Geology of the subsurface is not known, but pre-Tertiary marine sedimentary rocks may exist at depth.

Vegetation

The southern end of the WSA is mainly covered by a low sagebrush/Sandberg's bluegrass community above the rim and on the open area of Monument Flat. The rim on the south is primarily a western juniper/big sagebrush community. The northern part of the WSA is characterized by numerous stringers of aspen and juniper and mountain mahogany thickets. Associated with the aspen communities are isolated ponderosa pines and white firs. The mountain mahogany thickets are interspersed with communities of big sage-bitterbrush/bluegrass or Idaho fescue communities. The steep scarps along the eastern border are covered with juniper, mountain mahogany, big sagebrush, currants, bitterbrush, bluebunch wheatgrass, Great Basin wildrye, and wildflowers.

Vegetative communities in the WSA vary from early seral in one of the aspen groves and along the southern edge of the WSA to late seral in the low sagebrush/Idaho fescue community and on the scarp on the east side of the WSA. (Seral refers to a stage of ecological condition based on the difference between the present plant community and climax vegetation, the relatively stable, final stage in plant succession.)

Portions of the northern part of the WSA have been studied by the Pacific Northwest Research Natural Area Committee for possible Research Natural Area (RNA) designation. The RNA, if designated, would include portions of the mountain mahogany and aspen community along with several of the sagebrush/bunchgrass communities. (In an RNA, natural features are protected for research and educational purposes.)

A plant species of special interest (mentioned in the Special Features section) has been identified in the WSA: *Melica stricta* (strict onion grass). This plant species is on List 2 of the Oregon Natural Heritage Plan's "Rare, Threatened, and Endangered Plants and Animals of Oregon."

Wildlife

Fish Creek Rim is a high-density nesting area for many species of raptors. On a five-mile section of the rim, over twenty stick nests and falcon scrapes (aerie) have been observed. The rim is known as a historical peregrine falcon use area and there have been recent sightings of the birds; however, no active nests have been discovered. The rim area is a proposed release site for reintroduction of peregrine falcons.

All of the WSA, except for a small portion of low sagebrush flats, is within the Deep Creek deer herd crucial winter range. The WSA comprises 17% of the crucial winter range. Winter habitat conditions are fair to good on most of the area.

A small portion of the southwest corner of the WSA is used as an antelope kidding area. Bighorn sheep have been sighted several times on the rim, but their present status is not known.

Several springs have been developed and fenced for the benefit of wildlife along the rim. Construction of a guzzler (small wildlife watering device), to provide permanent water for antelope, is proposed within the WSA. Approximately 200 acres of low sagebrush southwest of Indian Spring are proposed to be burned and seeded with crested wheatgrass to increase antelope forage.

Livestock Grazing

The WSA includes parts of six grazing allotments. Table 4 summarizes existing and potential livestock use in AUMs (animal unit months, the amount of forage needed to sustain one cow and a half, or equivalent animals, for one month).

Existing livestock projects in the WSA (among the man-made features mentioned in the Naturalness section) include 22 small water developments and 4 miles of fence.

Livestock improvements proposed within the WSA include one reservoir and one mile of fence to better distribute livestock, and 500 acres of burn-and-seed and 300 acres of seeding to increase forage. These projects could potentially increase forage in the study area and the allotments by 164 AUMs.

Operators periodically use motor vehicles for livestock inspections and salting. Livestock gathering and minor fence maintenance is done by horseback. Motor vehicles are needed for major fence maintenance.

Wood Products Harvest

There are 2,160 acres of juniper in the study area that potentially could be harvested for fence posts and firewood. Demand is limited, however.

Cultural Resources

The WSA contains rock art sites, primitive hunting blinds, and at least one prehistoric bighorn sheep hunting complex.

Recreation Use

The principal vehicle-oriented recreation use of the area is hunting and sightseeing. A number of hunter camps are located inside the WSA and along the boundary of the area at Cox and Clelland Springs. The area receives moderate to heavy hunting pressure. Many local residents use the area as a sightseeing location, driving to the rim and overlooking the landscapes in all directions. Primitive recreation use at the present time is very low in the WSA.

Economic Value and Local Income

Livestock grazing and recreation are the only resource outputs which generate economic activity in this WSA. The WSA currently produces 778

Table 4. Existing and Potential Livestock Use, Fish Creek Rim WSA (OR-1-117)

Grazing Allotment	Licensed AUMs in Allot.	Period of Use	Percent of Allot. in WSA	Current Actual Use in WSA (AUMs)	Potential Increase in WSA(AUMs)[1]
Hickey Ind. (No. 202)	519	04/10-09/25	59	306	0
Vinyard (No. 201)	510	04/10-09/31	28	133	0
Crump (No. 204)	92	04/16-06/15	100	92	81
Lane Plan 2 (No. 206)	450	04/10-07/10	15	67	83
Lynch-Flynn (No. 520)	882	05/01-07/15	13	115	0
524	65	03/01-02/28	100	65	0
Total	2,518			778	164

[1] Increases might or might not result in increased licensed use in the allotment (see narrative).

animal unit months (AUMs) of livestock forage and an unknown amount of recreation activity annually. As of January 1, 1984, there were no oil and gas leases or geothermal leases on the WSA.

The economic value of existing outputs amounts to $5,866 annually and local personal income generated by existing outputs amounts to $7,990 annually. The terms economic value and local personal income are discussed in the Statewide EIS volume.

Environmental Consequences

This section discusses the environmental consequences of implementing each of the alternatives. Resources and activities not significantly affected by any of the alternatives are not discussed. General impact conclusions applicable to all WSAs, including impact conclusions based on speculative future developments (developments which are possible, but are not currently proposed), are discussed in the Statewide EIS volume. That volume also discusses certain assumptions that were made for this analysis.

Effects on Wilderness Values

The **all wilderness alternative** would add all 16,070 acres of public land in the WSA to the National Wilderness Preservation System (NWPS). This would preserve the natural values on the face of Fish Creek Rim as well as the unique mix of vegetative communities west of the rim which add much to the wilderness values of the WSA. Opportunities for primitive recreation and solitude would also be preserved. Wilderness designation would preserve plant species of special interest, crucial deer winter range, cultural resource sites, and habitat for bighorn sheep, peregrine falcons and other raptors.

In this alternative, wilderness values in the WSA could be adversely affected by development of the adjacent split-estate section which is nearly surrounded by the WSA. However, topography limits the likelihood of development of the split estate. To a minor degree, development of the private lands in the north could also adversely affect wilderness values.

On the south portion of the WSA, maintenance of the microwave tower and access road and the other rights-of-way north of Highway 140 would have a continuing adverse effect on solitude and naturalness in the portion between the highway and the tower access road. This portion of the WSA has lower wilderness values than other portions of the WSA due to the sights and sounds of developments and activities outside the area. Closure of 4 miles of ways would enhance wilderness values.

The **enhanced wilderness alternative** would add 16,740 acres to the NWPS, assuming the 1,000 acres of adjacent split-estate and private land could be acquired. Acquisition of the split-estate parcel would enhance wilderness values by precluding possible development of the mineral estate.

Acquisition of private land at Cox Spring would eliminate the possibility that the lands would be developed in ways which would adversely affect wilderness values on adjacent public lands. These acquisitions would also solidly block federal management on and below the rim, enhancing manageability in the north portion of the wilderness. Closure of 6 miles of ways would enhance wilderness values.

Lands recommended nonsuitable on the south from the tower access road to Highway 140 could be utilized for additional rights-of-way inside the present corridor and for maintenance activities on the microwave tower road; the effects on wilderness values in the nonsuitable portion would be the same as those described for the all wilderness alternative. Any future activity in the nonsuitable portion would not impair wilderness values in the portion recommended as suitable for wilderness because the two areas are topographically isolated from each other.

The **partial alternative** would add 11,900 acres to the NWPS, assuming acquisition of 600 acres of split-estate land. The partial alternative would maintain wilderness values on most of the Fish Creek Rim from Adel to lands north of Crump Lake. This would preserve a high potential for reintroduction of peregrine falcon and would protect many of the cultural sites in the WSA. It would also preserve the plants of special interest and much of the vegetative diversity of the WSA. Opportunities for primitive recreation potential along much of the rim would also be preserved in this alternative. Closure of 3 miles of ways would enhance wilderness values.

A total of 4,770 acres would be recommended nonsuitable for wilderness in the partial alternative. A total of 600 acres would be seeded in three vegetative manipulation projects in the nonsuitable areas. Ecological processes and apparent naturalness would be adversely affected.

Range management activities, vehicle use would continue to adversely impact wilderness values in the nonsuitable areas.

The **no wilderness/no action alternative** would allow for vegetative manipulation on approximately 1,000 acres; this would reduce the naturalness of those areas. Potential geothermal development along the base of the rim could have substantial adverse effect on wilderness values, especially if commercial generating facilities were constructed. Continued vehicle use related to recreation and livestock management would adversely affect solitude and primitive recreation.

Effects on Energy and Mineral Development

Areas designated wilderness would be withdrawn from mineral exploration and development. Table 5 shows the acres that would be withdrawn under each alternative, including areas rated high or moderate for certain minerals.

Effects on Vegetation

Under the **all wilderness, enhanced wilderness and partial alternatives**, vegetation would be preserved in the area recommended suitable, including the area under study for RNA designation.

In the nonsuitable portion of the partial alternative, 200 acres of burn-and-seed for wildlife would reduce vegetative diversity by temporarily eliminating shrubs and forbs and converting vegetation to crested wheatgrass.

Table 5. Effects of Alternatives on Energy and Mineral Development, Fish Creek Rim WSA (OR-1-117)

	Acres Withdrawn			
	All Wilderness	Enhanced Wilderness	Partial	No Wilderness/ No Action
Total acres	16,070	15,740[1]	11,300[2]	0
Metals rated moderate	16,070	15,740	9,100	0
Geothermal rated high	4,480	3,240	3,400	0
Diatomite rated moderate	2,660	1,760	1,040	0

[1] Development also precluded on an additional 1,000 acres if split-estate and private land is acquired as proposed under this alternative.

[2] Development also precluded on an additional 600 acres if split-estate land is acquired as proposed under this alternative.

Under the **no wilderness/no action alternative**, vegetation diversity on 1,000 acres would be reduced by burning and seeding for wildlife and livestock. Where there are aspen groves and other favored rest areas for cattle near seedings, the increased grazing could be detrimental to these fragile communities.

In areas recommended nonsuitable, the plant species of special interest would be subject to disturbance, since it is not formally protected. However, this species could be designated as a BLM sensitive species and as such would receive the same protection as federally listed threatened or endangered species.

Effects on Wildlife

Wildlife habitat would be preserved in areas designated wilderness.

The **all and enhanced wilderness alternatives** would preclude 200 acres of burn-and-seed for antelope habitat improvement. Under the **partial alternative**, the burn-and-seed would be in the nonsuitable portion and thus would be allowed. This would not influence animal numbers, but would improve forage quality in this area.

The all wilderness, enhanced wilderness, and partial alternatives might or might not preclude the development of a wildlife guzzler, depending on a site-specific assessment of whether it conformed with Wilderness Management Policy. This project would not influence animal numbers. Potential wildlife forage from livestock improvements would not be foregone. No significant impacts are expected under these alternatives.

The burn-and-seed and the guzzler would be allowed under the **no wilderness/no action alternative** thereby improving antelope habitat and distribution. No significant impacts are expected.

Effects on Livestock Grazing

Both the **all and enhanced wilderness alternatives** would preclude vegetative manipulation projects for livestock totaling some 800 acres; as a result, an opportunity to provide an additional 164 AUMs of forage would be foregone. Vehicle use for salting, gathering and checking livestock could be restricted, unless there were no practical alternatives to using vehicles. Restricting vehicle use would have minor impacts on the grazing operator.

The proposed projects have an overall benefit/cost ratio of less than 1:1.

The reservoir and fence might or might not be allowed under the all wilderness, enhanced wilderness and partial alternatives, depending on a site-specific analysis of whether they conform with Wilderness Management Policy. If not allowed, the opportunity to better distribute livestock would be foregone.

Under the **partial alternative**, there would be 400 acres of vegetative manipulation leading to an increase of approximately 83 AUMs of forage. Development of an additional 81 AUMs would be foregone.

Under the **no wilderness/no action alternative** there would be approximately 800 acres of vegetative manipulation for livestock leading to an increase of 164 AUMs.

Effects on Wood Products Harvest

The **all wilderness, enhanced wilderness and partial alternatives** would preclude harvest of juniper from 2,160, 1,720 and 600 acres, respectively. Demand for the juniper, however, can be met outside the WSA.

There would be no impact under the **no wilderness/no action alternative**.

Effects on Recreation Use

Both the **all and enhanced wilderness alternatives** would restrict vehicle access into the WSA and this would affect both sightseers and hunters traveling by vehicle in the area. The majority of the WSA west of the rim is so narrow that these activities would be made only slightly more difficult by restricting vehicles, but such use would not be precluded. The southwest portion of the WSA would be the area of greatest impact to vehicle-oriented hunters.

Primitive recreation would be enhanced under both alternatives, and hunters, especially those hunting by horseback, might find hunting improved by the elimination of vehicles which disturb and move game.

Overall recreation use in the area would be expected to remain generally stable. A possible slight increase in levels of primitive recreation might increase total use slightly. Vehicle access to the microwave tower would be allowed under all alternatives, so some vehicle-oriented sightseeing would still be available.

The **partial alternative** would leave much of the southern portion of the WSA open to vehicle use, and this would minimize the impact on vehicle-oriented hunting. Vehicles could continue to use the Sweeney Canyon area, among others. Sightseers could continue to drive to the rim in the north part of the WSA. Primitive opportunities in the nonsuitable areas would decrease, however. The net effect is expected to be a slight increase in recreation use.

The **no wilderness/no action alternative** would allow the vehicle-oriented recreation use of the area to continue. Livestock and wildlife projects would improve access for this type of recreation. Primitive recreation would be adversely affected to some degree by continued vehicle use in the area. No significant impact on overall recreation use is expected under this alternative.

Effects on Economic Value and Local Income

The economic effects for the alternatives are presented in tables 6 and 7. Table 6 shows the effects on economic value and table 7, the effects on local personal income. It is not known at this time whether individual proposed structural developments, such as the reservoirs proposed for this WSA, would be constructed if the area were designated wilderness. It is known that vegetative manipulation projects, such as the proposed burn to control sagebrush, would not be allowed.

The columns for the wilderness alternatives show the effects as a range of values dependent upon whether structural improvements, and/or grazing operator access, were allowed.

Currently, there is little dependence on vehicles for livestock management in the study area. The all

Table 6. Effects of Alternatives on Annual Economic Value, Fish Creek Rim (OR-1-117) (1981 price levels)

Item	Unit of Measure	All Wilderness/ Enhanced Wilderness	Partial	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS				
Grazing: Investment[1]	AUM	0	+83	+164
VALUE OF PLANNED INVESTMENTS[2]				
Grazing	$	0	+626	+1,237
Investments[3]	$	0 to -1,123	-1,564 to -441	-3,152
Net Economic Value[4]	$	-1,123 to 0	-938 to +185	-1,915
VALUE OF OTHER EXPECTED CHANGES IN OUTPUTS				
Reduced access[5]	$	-44	-44	0
VALUE OF TOTAL EXPECTED CHANGES IN OUTPUTS				
All categories	$	-1,167 to -44	-982 to +141	-1,915

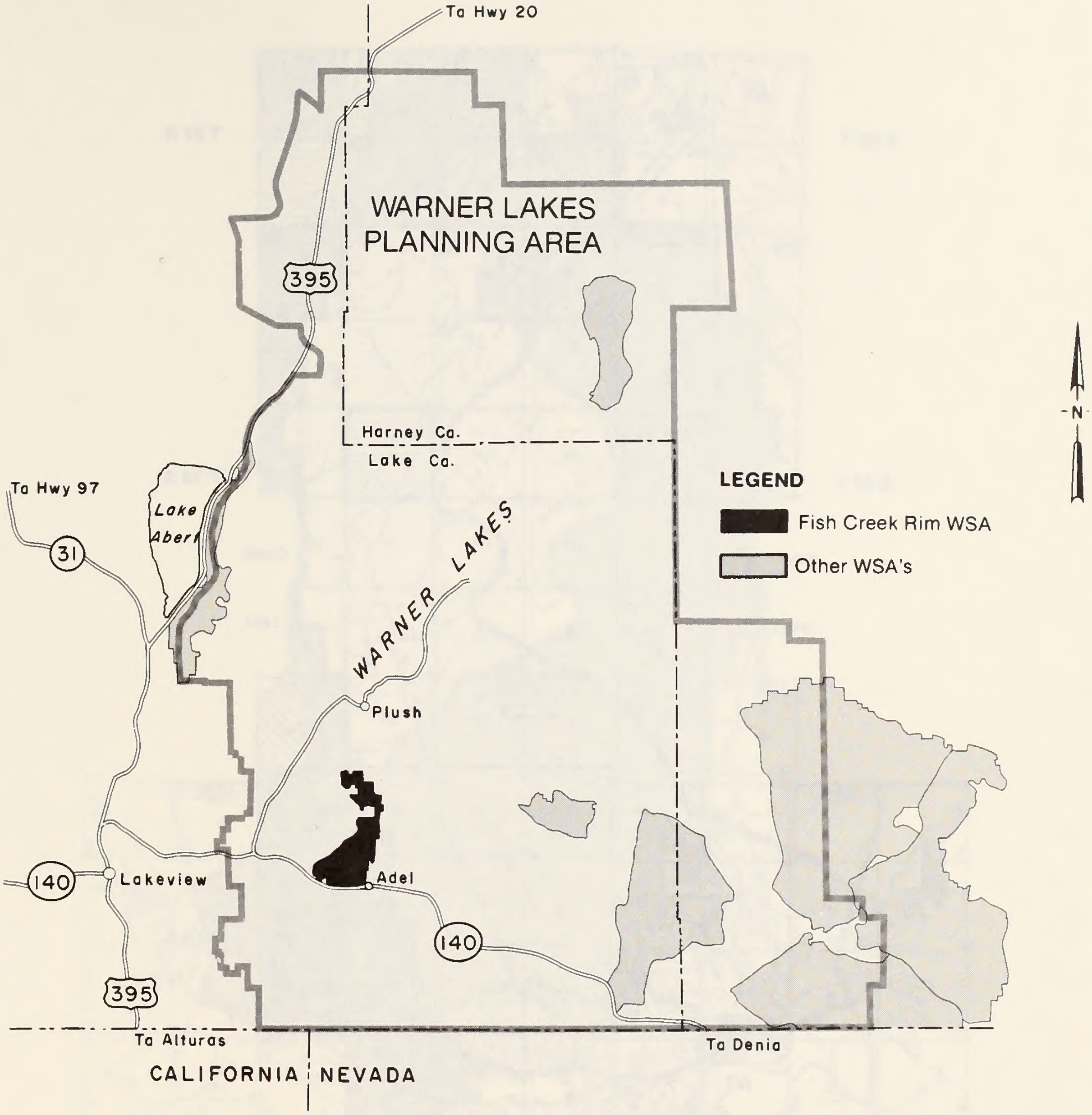
[1] Expected future increases due to range improvement investments.
[2] Vegetative manipulation project involving up to $25,185 total expenditures, and structural projects involving up to $13,940. Amounts shown in the table represent combined results of both types of projects, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.
[3] Average annual cost of investment expenditures amortized at 7.875% over 50-year period.
[4] For alternatives reflecting a range of negative net values (i.e., investment costs exceeding benefits), the figures are reversed to show the larger negative value as the lower end of the range (e.g., -20 to 0) so that the summation of effects for all categories in each column will show the full range of potential effects.
[5] Additional cost (shown as negative value) due to restriction of vehicular access for livestock operator.

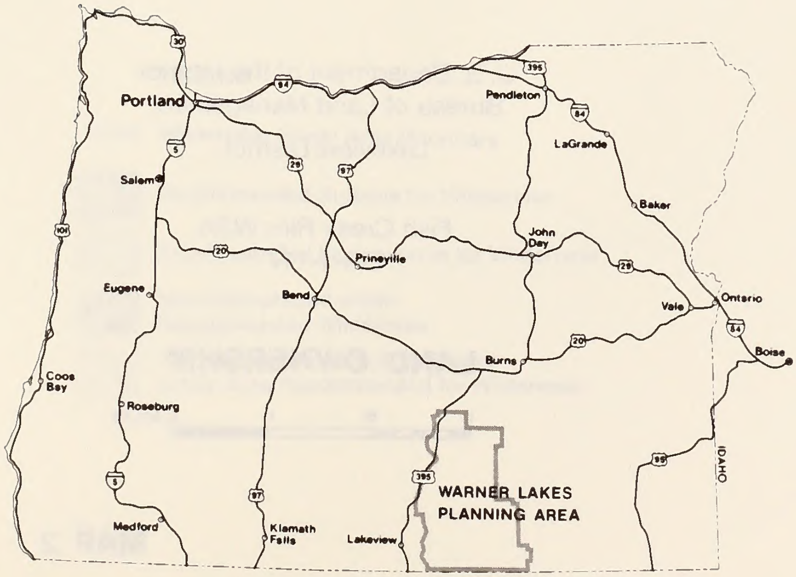
Table 7. Effects of Alternatives on Local Personal Income, Fish Creek Rim WSA (OR-1-117) (1981 price levels)

Item	Unit of Measure	All Wilderness/ Enhanced Wilderness	Partial	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS				
Grazing: Investment[1]	AUM	0	+83	+164
INCOME FROM PROPOSED INVESTMENTS[2]				
Grazing	$	0	+852	+1,684
Construction activity[3]	$	0 to +1,723	+1,791 to +3,736	+4,837
Total[4]	$	0	+852	+1,684

[1] Expected future increases due to range improvement investments.
[2] Vegetative manipulation project involving up to $25,185 total expenditures, and structural projects involving up to $13,940. Amounts shown in the table represent combined results of both types of projects, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.
[3] Local personal income generated annually during assumed 5-year construction period. This amount cannot be added to the income resulting from grazing and hunting activity because it is not sustained over the analysis period.
[4] Detail may not sum to "Total" due to rounding. Total omits income from construction which is limited to 5-year period. See footnote 3.

wilderness alternative would restrict such vehicle use unless there were no practical alternative. The maximum impact from road closures upon the grazing operator in the WSA would be an increase in cost of about $44 per year.





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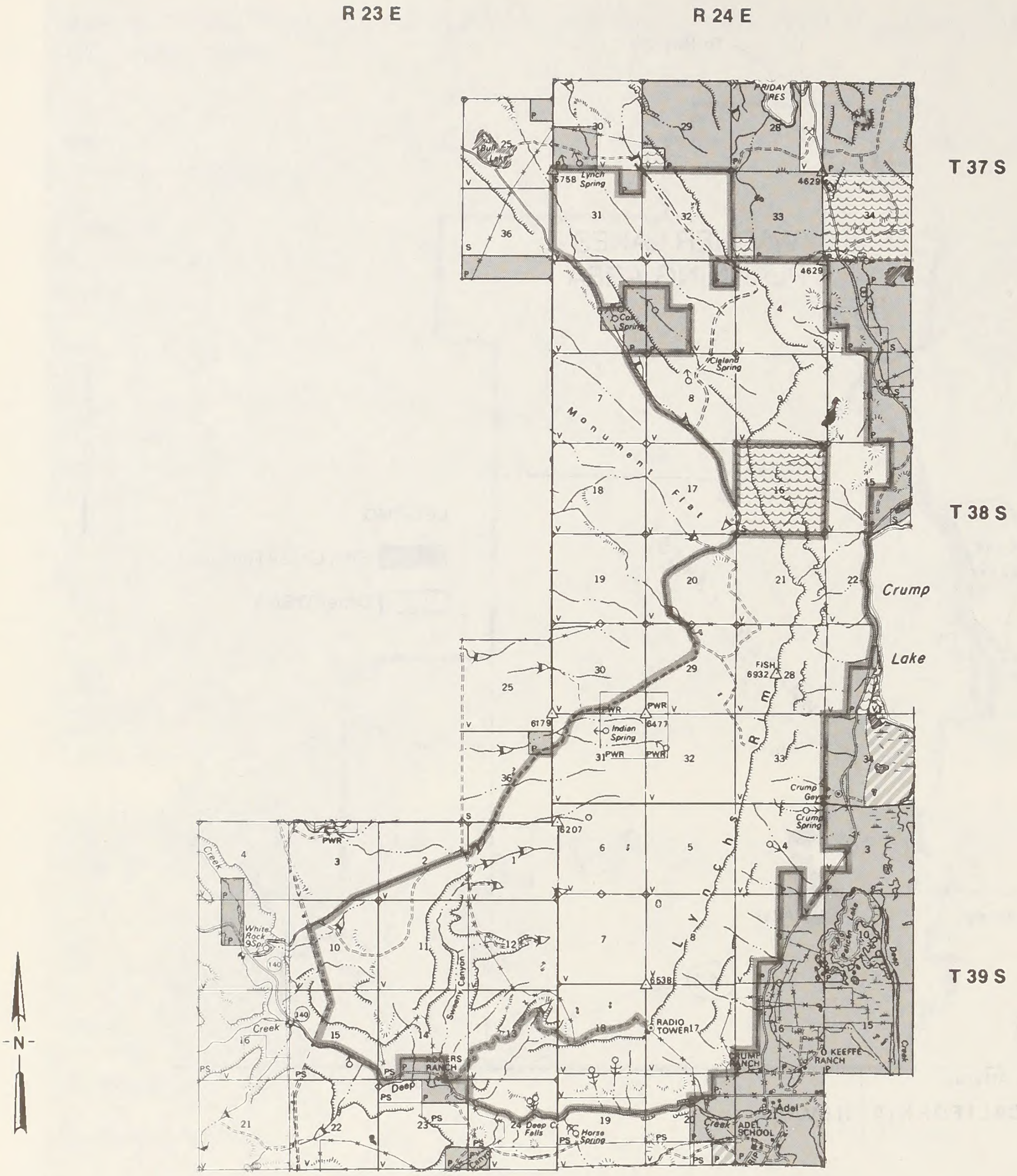
Bureau of Land Management
Lakeview District

Fish Creek Rim WSA
OR-1-117

LOCATION MAP

10 0 10 MILES

MAP 1



LEGEND

- ▬ Wilderness Study Area Boundary
- ☐ Bureau of Land Management
- ▨ State
- ▩ Private
- ≋ BLM Surface-State or Private Subsurface (Split Estate)

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Fish Creek Rim WSA
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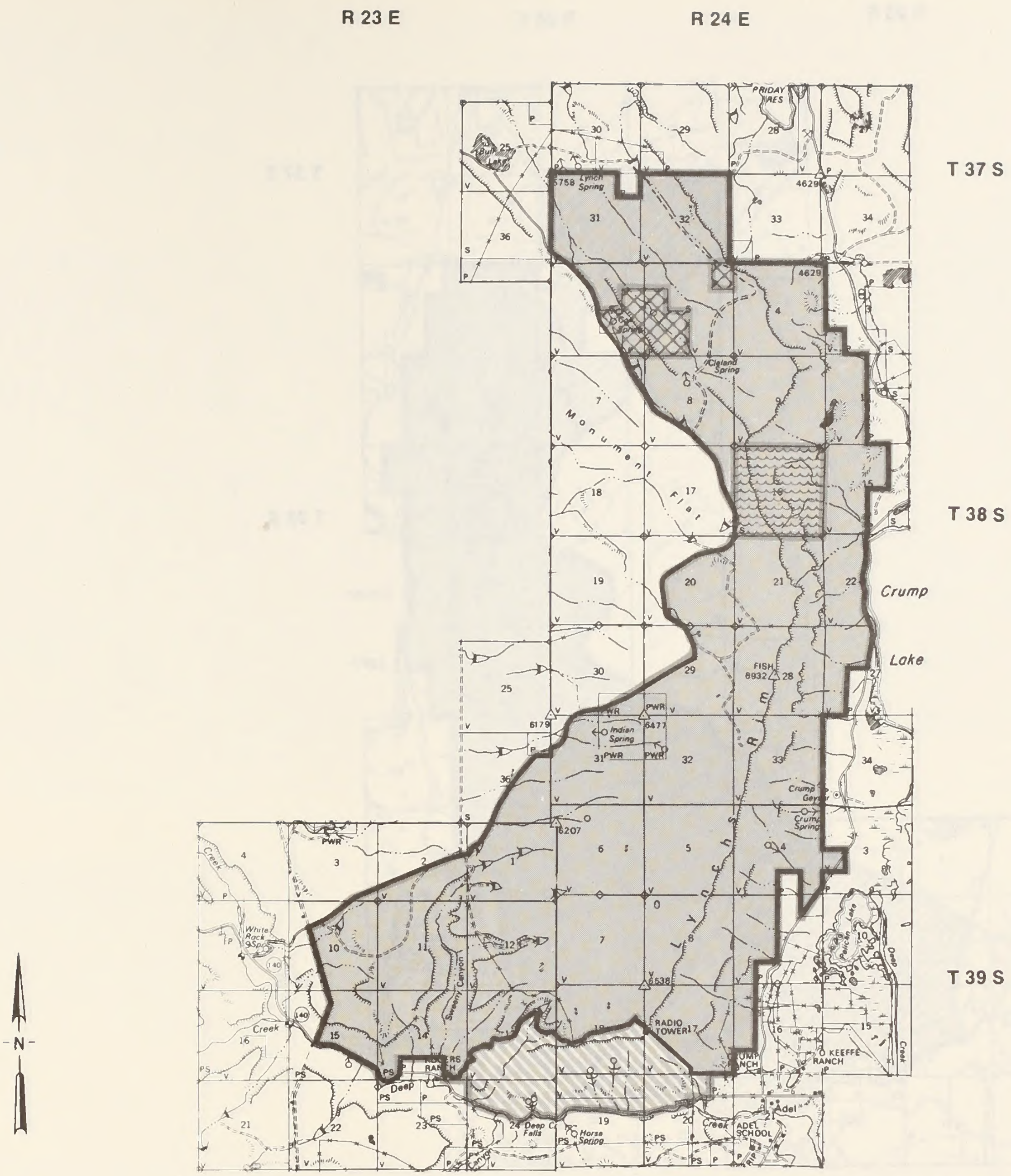
LAND OWNERSHIP

1 0 1 2 MILES

MAP 2



LEGEND

▬ Wilderness Study Area Boundary

▩ Recommended Suitable for Wilderness

▨ Recommended Non-suitable for Wilderness

▦ Non-Federal Land within Recommended Wilderness

▤ Non-Federal Minerals (Split Estate) within Area Recommended for Wilderness

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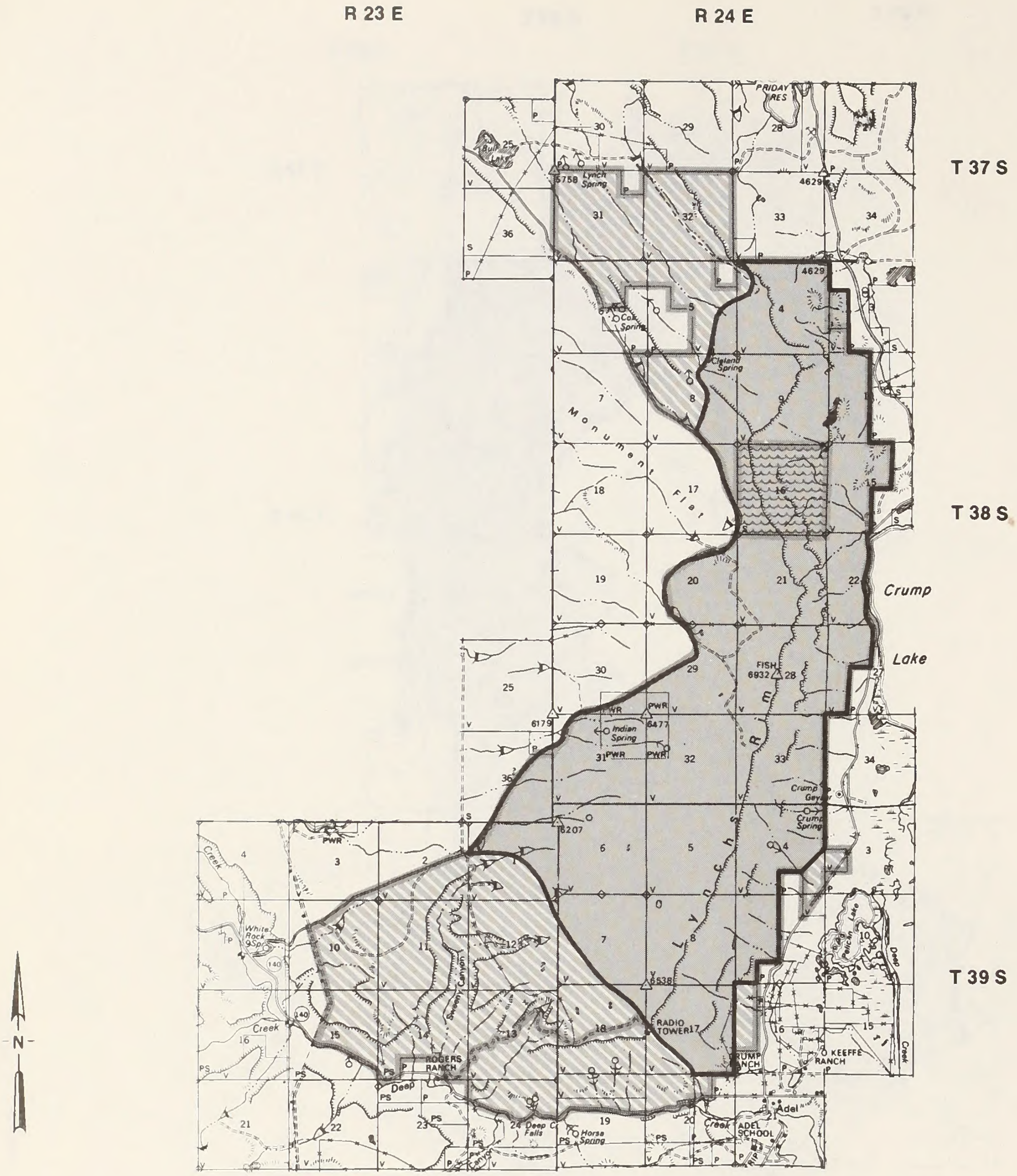
ENHANCED ALTERNATIVE

1 0 1 2 MILES

MAP 3



LEGEND

▬ Wilderness Study Area Boundary

▩ Recommended Suitable for Wilderness

▨ Recommended Non-suitable for Wilderness

▦ Non-Federal Minerals (Split Estate) within Area Recommended for Wilderness

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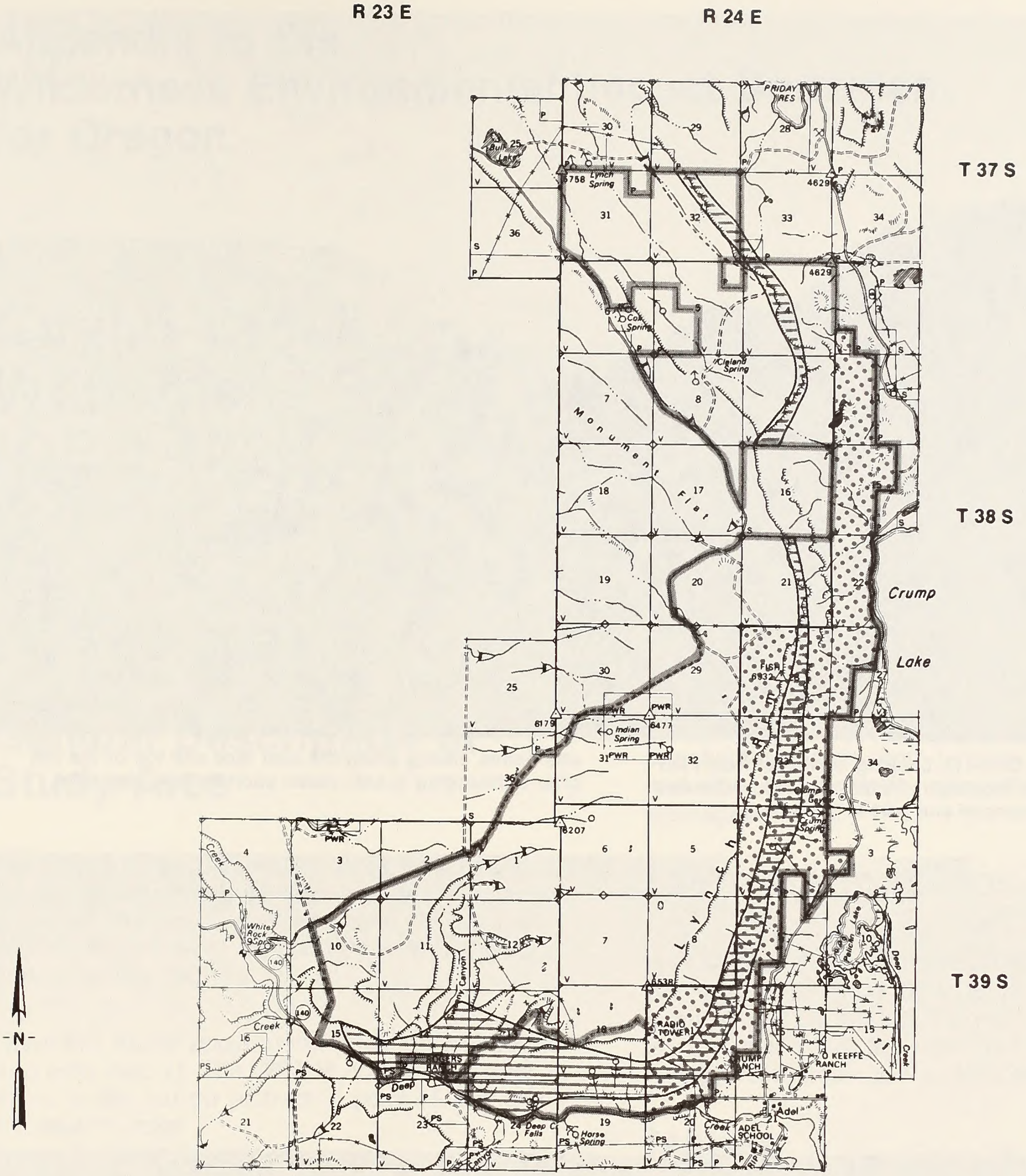
PARTIAL ALTERNATIVE

MAP 4



▨ **High Potential (4D) for Geothermal Resources (Also, Portion of WSA within known Geothermal Resource Area)**

▤ **Medium Potential (3B) for Diatomite**

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MEDIUM OR HIGH POTENTIAL MINERAL OR ENERGY RESOURCES

1 0 1 2 MILES

MAP 5

Fish Creek Rim WSA, OR-1-117. Looking northeast from Fish Creek Rim toward Hart Mountain. Within area recommended suitable under the enhanced and partial (preferred) alternative. Hiking along the east face and top of the rim offer outstanding scenic vistas such as this. May 1984.

Fish Creek Rim WSA, OR-1-117. Lowsage flats on the south end of the WSA. Within the area recommended suitable under the enhanced and partial (preferred) alternative. The broad, open areas here offer outstanding opportunities for solitude. May 1984.

Appendix to the Wilderness Environmental Impact Statement for Oregon

Guano Creek Wilderness Study Area (OR-1-132)

General Description of Study Area

The Guano Creek wilderness study area (WSA) is located approximately 67 miles northeast of Lakeview, Oregon, in southern Lake County (see map 1). It is 12 miles from the nearest highway, State Highway 140.

There are 10,350 acres in the WSA, all of it public land (see map 2). The WSA is oblong in outline with a small, narrow protruding point of land along the western edge.

Most of the boundary is comprised of BLM roads. Some 1 1/2 miles of the east boundary are bordered by the U.S. Fish and Wildlife Service's Shirk Ranch. Private land forms 1 1/2 miles of the north boundary near Billy Burr Lake.

The study area is characterized by open and rolling terrain, broken by shallow intermittent drainages, rims, and canyons. Elevation in the WSA varies from 5,200 feet in Guano Valley to 5,978 feet on the rim overlooking Guano Valley. The WSA contains two small desert sink lakes (a geologic feature created by circular depressions in the lava) and is crossed by three major intermittent drainages. The water in one of the drainages, Guano Creek, is partially controlled by an upstream reservoir outside of the WSA.

The area is mainly covered with low sagebrush and bunchgrasses with some junipers, big sagebrush, and other shrub species along the rims and drainages.

Interrelationships

Hart Mountain National Wildlife Refuge is located one mile north of the WSA. Shirk Ranch, administered by the U.S. Fish and Wildlife Service in conjunction with the Hart Mountain Wildlife Refuge, is adjacent to the WSA on the east.

Issues

Issues relating to each WSA were raised by BLM and the public during the wilderness inventory and EIS planning and scoping process. These issues concern both the effects of wilderness designation on existing and potential land uses or resources in the WSA, as well as the effects of existing and potential land uses or resources an wilderness values.

The only issue specifically raised for this WSA was the potential for a utility corridor and future construction of a powerline through the WSA. (A potential east-west utility corridor and powerline construction, which are under long-term consideration by Pacific Power and Light Company (PP&L) and Bonneville Power Administration (BPA), would not cross the WSA, but would pass to the north or south of it. Therefore, this issue is not discussed further in this appendix.)

Description of the Alternatives

The following alternatives are analyzed:

- all wilderness
- partial (preferred alternative)
- no wilderness/no action

All Wilderness

In the all wilderness alternative, all 10,350 acres of public land in the Guano Creek WSA would be recommended suitable as wilderness (see map 2).

Partial (Preferred Alternative)

The partial alternative would recommend 9,890 acres of public land suitable as wilderness (see map 3). It would recommend as nonsuitable 460 acres which protrude from the western edge of the WSA along Guano Creek. This area is less than one mile wide at any point. The boundary between the suitable and nonsuitable portions would follow a section line.

No Wilderness/No Action

The no wilderness/no action alternative would recommend the entire WSA nonsuitable as wilderness. It represents the situation most likely to occur without wilderness designation. The area would be managed according to the current land use plan, which includes the following features relevant to this analysis:

- construction of proposed livestock water developments, and
- continued availability for mineral exploration and development.

Table 1 summarizes the proposed management of the WSA under each alternative.

Table 2 summarizes the environmental consequences of each alternative.

Table 1. Summary of Proposed Management Under Each Alternative, Guano Creek WSA (OR-1-132)

Proposed Management	All Wilderness	Partial	No Wilderness/ No Action
Acres Designated as Wilderness	10,350	9,890	0
Acres Closed to ORVs by Wilderness Designation	10,350	9,890	0
Miles of Ways Closed	5	5	0
Acres Withdrawn from Mineral Location and Leasing by Wilderness Designation	10,350	9,890	0
Structural Livestock Projects Developed: Reservoirs & Waterholes (number)	0-2	0-2	2

Manageability of the Area as Wilderness

The areas recommended as suitable in the all wilderness and the partial alternatives would be manageable as wilderness.

Rationale for Selection of the Preferred Alternative

The partial alternative is preferred because the benefits of preserving wilderness values in the majority of the area would outweigh the benefits of retaining options for development of energy, mineral and other resources. The exception would be the narrow finger protruding from the southeast corner of the WSA. That portion of the WSA offers few opportunities for solitude, and allowing for resource development would represent a higher and better use of the land than would preservation of wilderness values.

Affected Environment

This section discusses only those activities or resources that influence the character of the study area, or that may be affected by the alternatives.

Wilderness Values

Naturalness

The Guano Creek WSA is in a natural condition. The area is characterized by undisturbed uplands and rims with two unaltered lakebeds.

Table 2. Summary of Environmental Consequences of Alternatives, Guano Creek WSA (OR-1-132)

Resource or Activity	All Wilderness	Partial (Preferred Alternative)	No Wilderness/No Action
Wilderness Values	Would add 10,350 acres to the NWPS. Preserves wilderness values in entire WSA, including primitive recreation, and natural qualities associated with the sink lakes, native plant communities, and wildlife habitat. Closure of 5 miles of ways would enhance naturalness and opportunities for solitude and primitive recreation. Area would be manageable as wilderness.	Would add 9,890 acres to the NWPS. 460 acres recommended nonsuitable. Effects in the area recommended suitable, including closure of 5 miles of ways, would be the same as all wilderness. In the nonsuitable portion, wilderness qualities could be lost because of possible mineral development. Area would be manageable as wilderness.	Entire WSA recommended nonsuitable. Proposed livestock projects could adversely affect wilderness values in the WSA. Naturalness associated with the small undisturbed lakebeds would also be damaged.
Energy and Mineral Development	Development precluded on 10,350 acres, including 10,350 acres with moderate potential for mercury, gold, and silver; and 6,000 acres with moderate potential for diatomite.	Development precluded on 9,890 acres, including 9,890 acres with moderate potential for mercury, gold, and silver; and 5,540 acres with moderate potential for diatomite.	No impact.
Vegetation	Vegetation preserved.	Vegetation preserved in suitable area.	Sink lake vegetation would be damaged and possibly altered by proposed project.
Wildlife	Wildlife habitat preserved.	Wildlife habitat preserved in suitable area.	Possible impacts on waterfowl habitat with development of sink lake.
Livestock Grazing	No significant impact. Minor adverse impact in livestock management if the two proposed water developments were not developed. Restrictions on vehicle use would be minor inconvenience to livestock operators in salting livestock.	Same as all wilderness.	Would allow livestock projects to be built improving livestock management in the area.
Recreation Use	Hunters would be inconvenienced by vehicle restrictions. Some vehicle-oriented recreation would change to primitive use. No change in overall recreational uses.	Same as all wilderness.	Primitive recreation values could be adversely affected by proposed projects. No change in overall recreation use.
Economic Value and Local Income	Changes in annual economic value could be a decrease of as much as $519 or no change depending on what proposed projects would be allowed in wilderness. Local personal income would not change. Excludes unknown economic effects of mineral development and of unquantified changes in recreation use.	Same as all wilderness.	Decrease in economic value by $519 and no change in local personal income from construction of proposed projects.

There are only a few man-made features in the WSA; they are small and visible only from the immediate area. These man-made features within the WSA include five miles of ways (vehicle routes established and maintained solely by the passage of vehicles) which occur mainly along the drainages and are visible only from along their routes. There are three very small reservoirs and 1 1/2 miles of fence in the WSA. The reservoirs are scattered and not noticeable for any distance.

Less than 1 percent of the WSA is influenced by these features. (The area of influence is an estimate the acreage within the WSA from which these features can be seen.)

Opportunities for Solitude or Primitive and Unconfined Types of Recreation

The opportunities for solitude are best in the areas of Guano Creek, the sink lakes, and around the rims and canyons scattered across the WSA. Here the vegetation is taller and the topographic features screen the visitor. The small protruding finger of land along the western edge offers less solitude because of its narrowness.

Opportunities for primitive and unconfined types of recreation are outstanding in the WSA. Day hiking, backpacking, camping, sightseeing, photography, wildlife observing, horseback riding, and some types of hunting are all good in the WSA. Day hiking can vary from flat, easy terrain on top to steep, rugged terrain in the canyon and rims.

Special Features

The two circular sink lakes in the northern portion of the WSA are geological features which are unique to the basalt flows of southeastern Oregon. There are few of these types of intermittent desert lakes left without water developments in them. Part of their significance is that they are undisturbed by water projects and the vegetation has not been totally altered by grazing. Tertiary tuffaceous sedimentary rocks along the eastern portion of the WSA contain late Miocene vertebrate fossils.

A plant species of special interest, *Eriogonum crosbyae*, is found in the WSA. (The Vegetation section further discusses this plant.)

Diversity in the National Wilderness Preservation System (NWPS)

According to the Bailey-Küchler System of classifying ecosystems, the Guano Creek WSA is located in the Intermountain Sagebrush Province with a potential natural vegetation of sagebrush steppe. Vegetative communities listed in the Basin and Range section of the Oregon Natural Heritage Plan which occur in the WSA are low sagebrush/Sandberg's bluegrass, silver sagebrush, and big sagebrush/bluebunch wheatgrass.

Guano Creek is located within 5 hours' driving time of 3 standard metropolitan statistical areas with populations over 100,000: Reno, Nevada; Boise, Idaho; and the Eugene/Springfield, Oregon; and Redding, California.

Energy and Mineral Development

Energy and mineral resources were evaluated by BLM using available geologic data and data provided in a report by TERRADATA, a consulting firm under contract with BLM. The report is titled "Assessment of Geology, Energy, and Minerals Resources of the Crump Lake Geologic Resource Area." The WSA is within the Crump Lake Geologic resource area which has been classified according to a rating system that indicates both the potential for occurrence (geologic favorability) of certain minerals, as well as the quantity and quality of data on which the rating is based (confidence level). A description of the rating system is provided in the Statewide EIS volume.

There is a moderate favorability for the occurrence of diatomite in the tuffaceous sedimentary rocks that occur in the WSA, and in several other areas in eastern Oregon.

Based upon the WSAs position along the Eugene-Denio Lineament, nearby siliceous volcanic rocks, and the potential for Tertiary epithermal (low-temperature) mineralization, the favorability for mercury, gold, and silver is moderate in the entire WSA. Mercury and silver are strategic minerals; but there are no known deposits of strategic and critical minerals in or near the WSA.

Table 3 shows the mineral potential classifications for the WSA. Map 4 shows the portions rated moderate (medium) for diatomite.

There were no geothermal or oil and gas leases

Table 3. Classification of Energy and Mineral Potential, Guano Creek WSA (OR-1-132)

Commodity	Area	Classification Level	Confidence Level
Metals (gold, silver, mercury)	Entire WSA	3	B
Geothermal	Entire WSA	2	B
Uranium/Thorium	Entire WSA	1	A
Coal	Entire WSA	2	B
Oil/Gas	Entire WSA	2	A
Limestone	Entire WSA	1	C
Bentonite	Entire WSA	1	A
Diatomite	See map 4	3	B
	Rest of WSA	1	B
Zeolites	Entire WSA	2	B

Legend:
Class 1 - Lack of indications of favorability
Class 2 - Low favorability
Class 3 - Moderate favorability
Class 4 - High favorability

Confidence Level A - Insufficient data or no direct evidence
Confidence Level B - Indirect evidence available
Confidence Level C - Direct evidence but quantitatively minimal
Confidence Level D - Abundant direct and indirect evidence

and no mining claims in the WSA as of January 1, 1984.

The surface rocks of the WSA are mostly Tertiary andesitic and basaltic flows and tuffaceous sedimentary rocks. Little is known of the subsurface geology but pre-Tertiary marine sedimentary rocks may exist at depth. Except for minor road aggregate sites, there are no known mineral deposits in or within 10 miles of the WSA.

Vegetation

A majority of the area is comprised of uplands which support a low sagebrush/Sandberg's bluegrass community. Many of the rims, canyons, and drainages contain big sagebrush, squaw currants, chokecherry, western juniper, mountain mahogany, aspen, Thurber's needlegrass, bluebunch wheatgrass, squirreltail, and Great Basin wildrye. The two sink lakes in the area consist mainly of common spike-rush, leafy arnica, poverty weed, mat muhly grass, and silver sagebrush. The creek side vegetation consists of bluegrasses, Junegrass, willows, silver sagebrush, rushes, and sedges.

The two sink lakes have been surveyed by the Pacific Northwest Research Natural Area Committee as a potential Research Natural Area (RNA), but more inventory is needed before a recommendation is made on their eligibility for RNA status.

The vegetative communities in the WSA are mid-seral (a stage of ecological condition based on the difference between the present plant community and climax vegetation, the relatively stable, final stage in plant succession).

There is a population of *Eriogonum crosbyae* (Crosby's buckwheat) (mentioned in the Special Features section) in the southeast corner of the WSA. The site is unique in soil and vegetative composition, with this species showing a lot of variability. The species is known to exist in only two other locations in Oregon and is a candidate for federal listing as threatened or endangered.

The riparian vegetation along Guano Creek on the east side of the WSA is in excellent condition.

Wildlife

The WSA presently receives some summer antelope use and year-long mule deer use. Waterfowl use the three small lakes and Guano Creek during some periods of the year. The rims and canyons are likely habitats for raptors, but no nests have been observed. The WSA is also habitat for coyotes, skunks, badger, weasel, perching birds, nighthawks, swifts, flycatcher, amphibians, reptiles, and numerous other birds and small mammals.

Livestock Grazing

The Guano Creek WSA is entirely within the Beatys Butte grazing allotment. Table 4 shows existing livestock use in AUMs (animal unit months, the amount of forage needed to sustain one cow and a calf, or equivalent animals, for one month).

Existing livestock developments (among the man-made features mentioned in the Naturalness section) are 3 reservoirs and 1 1/2 miles of fence. Three vehicle ways within the WSA are used by grazing operators for livestock inspection and salting.

The three small existing reservoirs in the WSA are important water sources when they fill, due to the lack of water in that area. They currently require access by vehicle for maintenance to restore depth and capacity. Livestock are gathered on horseback and minor repairs to fences are also done with the use of horses.

A reservoir and waterhole are proposed in the WSA to improve livestock distribution. The proposed reservoir would be a reconstruction of an existing reservoir at the south end of Clover Swale. The proposed waterhole would be located southeast of Billy Burr Lake. Neither project would increase livestock forage.

Recreation Use

Recreation in the study area consists mainly of hiking, sightseeing, photography, and hunting. Hunting is the recreation activity most associated with vehicle use within the area. Both deer hunting and upland game bird hunting occur in the WSA. Presently, the overall level of recreation use in the WSA is low.

Table 4. Existing Livestock Use, Guano Creek WSA (OR-1-132)

Grazing Allotment	Licensed AUMs in Allot.	Period of Use	Current Percent of Allot. in WSA	Actual Use in WSA (AUMS)
Beatys Butte (No. 600)	26,121	04/1-12/15	2	575

Economic Value and Local Income

Livestock grazing and recreation are the only resource outputs which generate economic activity in this WSA. The WSA currently produces 575 animal unit months (AUMs) of livestock forage and an unknown amount of recreation activity annually. As of January 1, 1984, there were no oil and gas or geothermal leases on the WSA.

The economic value of existing outputs amounts to $4,336 annually and local personal income generated by existing outputs amounts to $5,905 annually. The terms economic value and local personal income are discussed in the Statewide EIS volume.

Environmental Consequences

This section discusses the environmental consequences of implementing each of the alternatives. Resources and activities not significantly affected by any of the alternatives are not discussed. Impact conclusions applicable to all WSAs, including impact conclusions based on speculative future developments (developments which are possible, but are not currently proposed) are discussed in the Statewide EIS volume. That volume also discusses certain assumptions that were made for this analysis.

Effects on Wilderness Values

The **all wilderness alternative** would add 10,350 acres to the National Wilderness Preservation System (NWPS) and preserve wilderness qualities on the entire WSA. The sink lakes, the native plant communities, and wildlife habitat would be protected from developments. Designation would maintain primitive recreation and opportunities for solitude. Approximately 7 miles of Guano Creek would be preserved. Closure of 5 miles of ways would enhance the naturalness. It also would enhance opportunities for solitude and primitive recreation.

The **partial alternative** would add 9,890 acres to the NWPS. Wilderness qualities on the nonsuitable portion, totaling 460 acres, could be impaired by development of minerals or other resources. Approximately 6 miles of Guano Creek would be preserved. Closure of 5 miles of ways would enhance wilderness values.

Under the **no wilderness/no action alternative**, development of waterholes would damage the sink lakes by concentrating livestock, removing vegetation, and eventually altering the vegetation to weedy species tolerant of grazing.

Any mineral development could adversely affect wilderness values, including the area's special wilderness features and opportunities for solitude and primitive recreation. Some adverse effects from oil and gas or geothermal lease development could be mitigated through lease stipulations.

Effects on Energy and Mineral Development

Areas designated wilderness would be withdrawn from mineral exploration and development: 10,350 acres under the **all wilderness alternative** and 9,890 acres under the **partial alternative**.

These withdrawals would include the area rated moderate for metals, which encompasses the entire WSA, and the 6,000 acres rated moderate for diatomite; the partial alternative would withdraw 5,540 acres of this portion rated moderate for diatomite.

No acreage would be withdrawn under the **no wilderness/no action alternative**.

Effects on Vegetation

Areas designated wilderness would not be subject to most surface disturbing activities. Vegetation dependent upon the existing undeveloped environment would thus be maintained.

Under the **no wilderness/no action alternative**, vegetation in the two small sink lakes could change from a dominant species of spike-rushes to a dominant species of leafy arnica with increased grazing pressure. The proposed water project in the small lake would lower the water table in the lakebed, making less water available to plant species with shallow root systems. The change in vegetation and the development of livestock water in the lakebeds could eliminate the lakes from RNA consideration. The federal candidate species of special interest would receive the same protection as federally listed threatened or endangered species.

Effects on Wildlife

Wildlife habitat would be preserved under the **all wilderness alternative**.

The **no wilderness/no action alternative** would subject the sink lakes to development of livestock water projects, which would reduce vegetative type and cover for wildlife and waterfowl.

Effects on Livestock Grazing

There would be no change to existing livestock use under any of the alternatives.

Under the **all wilderness and partial alternatives**, the two proposed water developments might or might not be allowed, depending on a site-specific analysis of whether they conform with Wilderness Management Policy. If not allowed, there would be a minor adverse effect on livestock management in the area. These projects have a benefit/cost ratio less than 1:1. Restrictions on vehicle use in the WSA would cause a minor inconvenience to grazing operators in salting livestock.

Under the **no wilderness/no action alternative**, the two proposed water projects in the WSA would be developed.

Effects on Recreation Use

In the **all wilderness and partial alternatives**, primitive recreation associated with hiking, photography, horseback riding, and camping would be preserved in the WSA. Hunters would be inconvenienced in not being able to use a vehicle. Some vehicle-oriented recreation use would change to primitive use. The area is presently used only lightly for primitive and vehicle-oriented recreation, and it is expected that there will be no significant change in overall recreation use.

In the **no wilderness/no action alternative**, development of a waterhole in one of the small lakes would increase livestock use and make it less desirable for primitive recreation activities. Overall recreation use would not change under this alternative.

Effects on Economic Value and Local Income

The economic effects for the alternatives are presented in tables 5 and 6. Table 5 shows the effects on economic value and table 6, the effects on local personal income. It is not known at this time whether individual proposed structural developments, such as the reservoir and waterhole proposed for this WSA, would be constructed if the area were designated wilderness. The column for the wilderness alternatives shows the effects as a range of values dependent upon whether structural improvements and/or grazing operator access were allowed.

Currently, there is little dependence on vehicles for livestock management in the study area. The wilderness alternatives would restrict such vehicle use unless there were no practical alternative. The maximum impact from road closures upon the grazing operator in the WSA would be an increase in cost of about $23 per year.

Table 5. Effects of Alternatives on Annual Economic Value, Guano Creek WSA (OR-1-132) (1981 price levels)

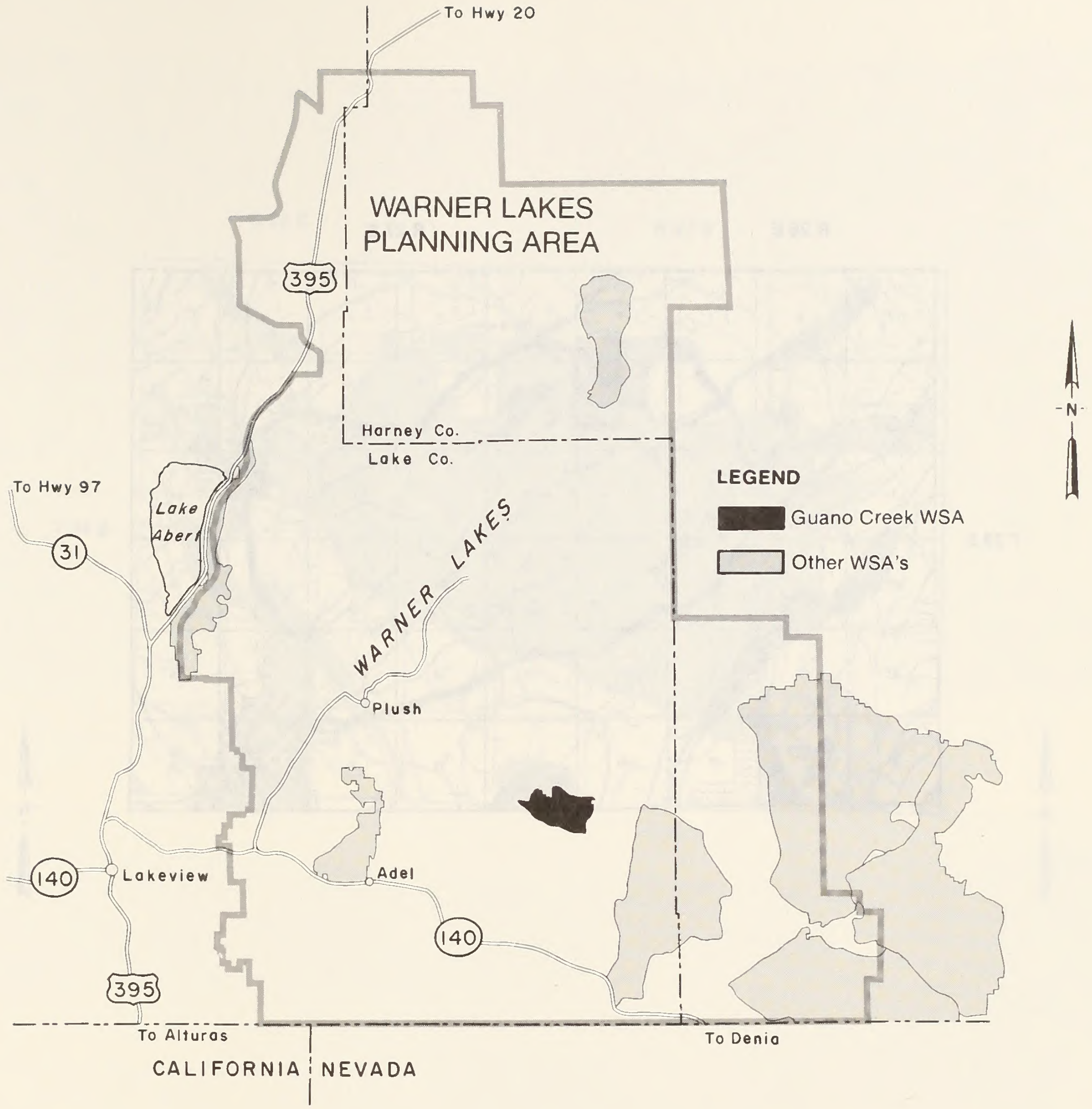
Item	Unit of Measure	All Wilderness, Partial	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS			
Grazing:			
Investment[1]	AUM	0	0
VALUE OF PLANNED INVESTMENTS[2]			
Grazing	$	0	0
Investments[3]	$	0 to -519	-519
Net Economic Value[4]	$	-519 to 0	-519
VALUE OF OTHER EXPECTED CHANGES IN OUTPUTS			
Reduced access[5]	$	-23	0
VALUE OF TOTAL EXPECTED CHANGES IN OUTPUTS			
All categories	$	-542 to -23	-519

[1] Expected future increases due to range improvement investments.
[2] Structural projects involving up to $6,440 total expenditures, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.
[3] Average annual cost of investment expenditures amortized at 7.875% over 50-year period.
[4] For alternatives reflecting a range of negative net values (i.e., investment costs exceeding benefits), the figures are reversed to show the larger negative value as the lower end of the range (e.g., -20 to 0) so that the summation of effects for all categories in each column will show the full range of potential effects.
[5] Additional cost (shown as negative value) due to restriction of vehicular access for livestock operator.

Table 6. Effects of Alternatives on Local Personal Income, Guano Creek WSA (OR-1-132) (1981 price levels)

Item	Unit of Measure	All Wilderness, Partial	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS			
Grazing:			
Investment[1]	AUM	0	0
INCOME FROM PROPOSED INVESTMENTS[2]			
Grazing	$	0	0
Construction activity[3]	$	0 to +796	+796
Total[4]	$	0	0

[1] Expected future increases due to range improvement investments.
[2] Structural projects involving up to $6,440, total expenditures, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.
[3] Local personal income generated annually during assumed 5-year construction period. This amount cannot be added to the income resulting from grazing and hunting activity because it is not sustained over the analysis period.
[4] Detail may not sum to "Total" due to rounding. Total omits income from construction which is limited to 5-year period. See footnote 3.



U. S. Department of the Interior
Bureau of Land Management

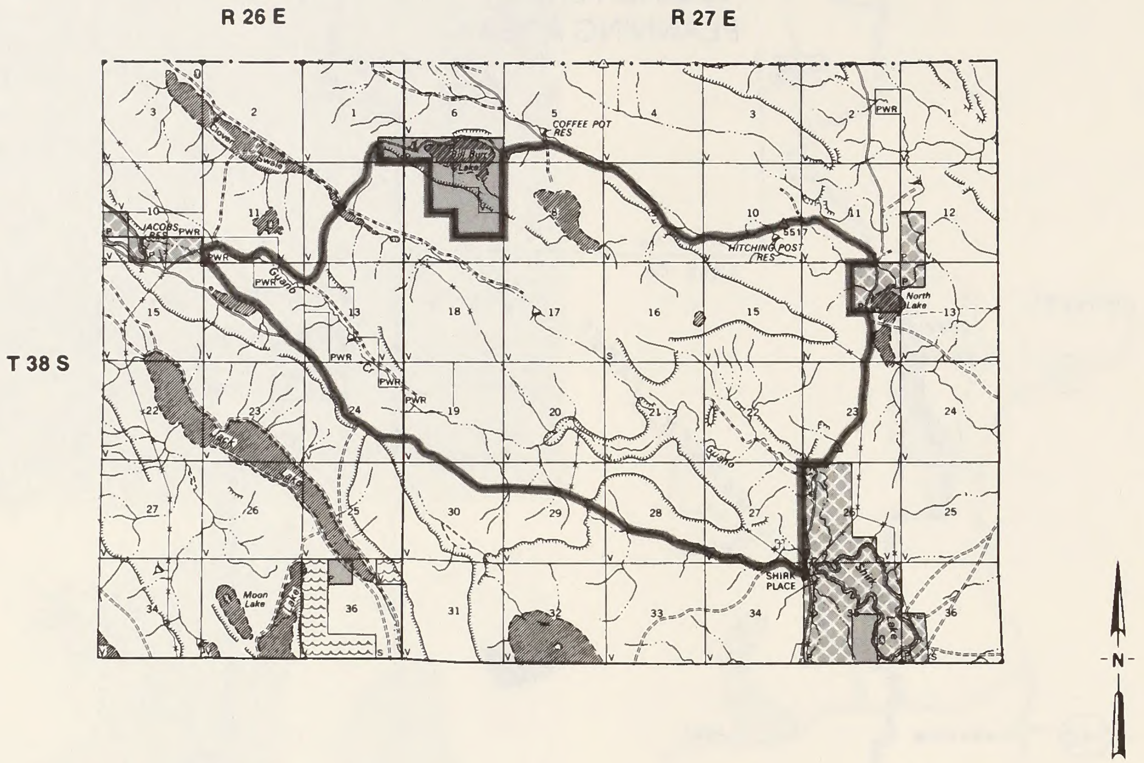
Lakeview District

Guano Creek WSA
OR-1-132

LOCATION MAP

10 0 10 MILES

MAP 1



LEGEND

▬ Wilderness Study Area Boundary

☐ Bureau of Land Management

■ Private

▨ U.S. Fish and Wildlife Service

≋ BLM Surface-State or Private Subsurface (Split Estate)

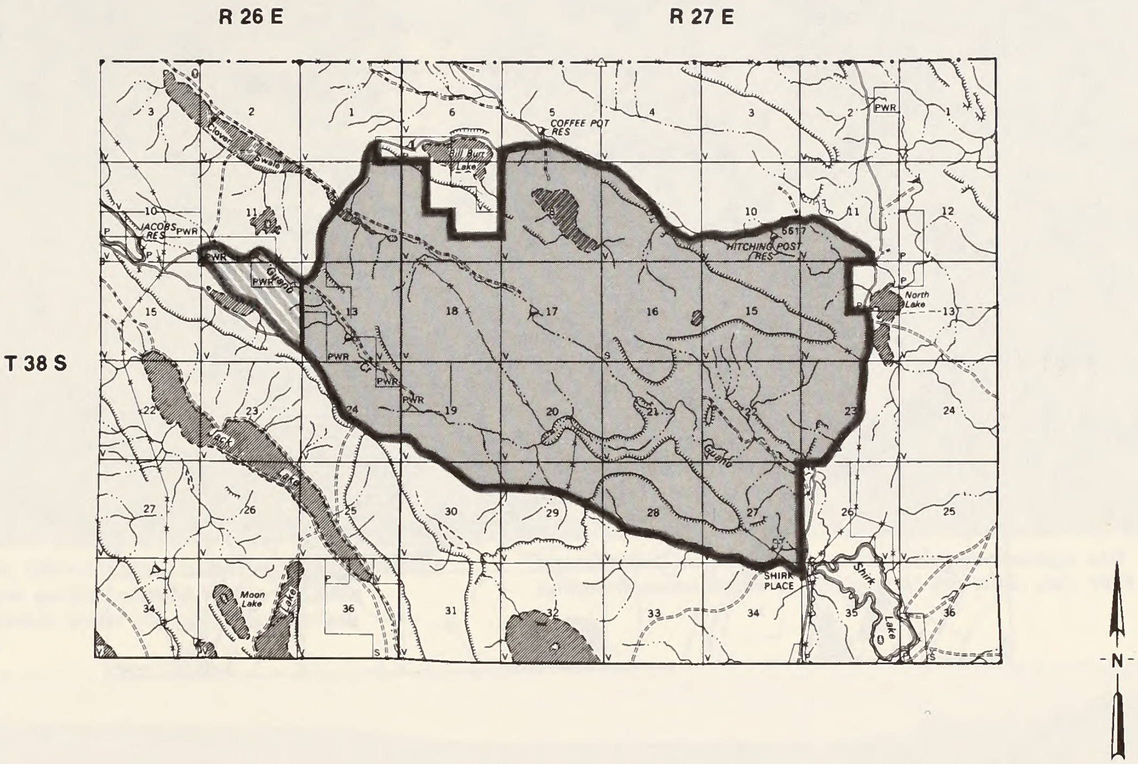
U. S. Department of the Interior
Bureau of Land Management
Lakeview District

Guano Creek WSA
OR-1-132

LAND OWNERSHIP

1 0 1 2 MILES

MAP 2



LEGEND

▬ Wilderness Study Area Boundary

▩ Recommended Suitable for Wilderness

▨ Recommended Non-suitable for Wilderness

U. S. Department of the Interior
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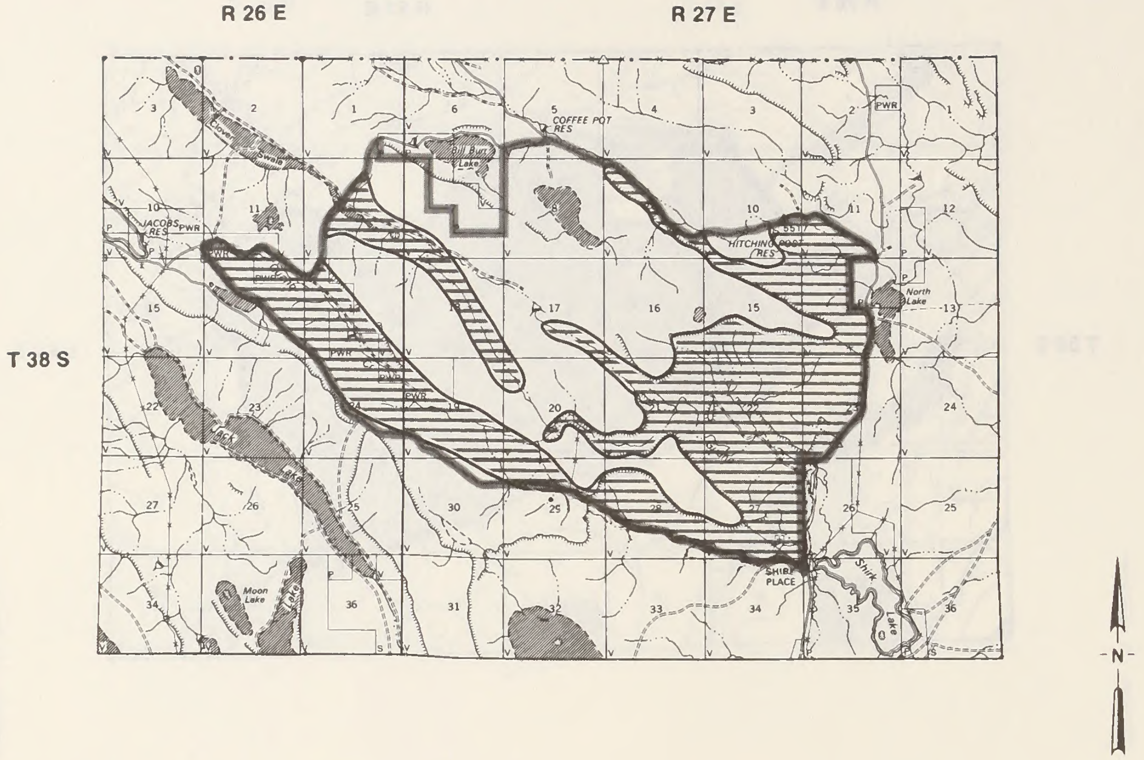
Lakeview District

Guano Creek WSA
OR-1-132

PARTIAL ALTERNATIVE

1 0 1 2 MILES

MAP 3



▤ **Medium Potential (3B) for Diatomite**

Entire WSA:
Medium Potential
(3B) for Mercury, Gold and Silver

U. S. Department of the Interior
Bureau of Land Management
Lakeview District

Guano Creek WSA
OR-1-132

MEDIUM OR HIGH POTENTIAL MINERAL OR ENERGY RESOURCES

1 0 1 2 MILES

MAP 4

Guano Creek WSA, OR-1-132. Low basalt cliffs along Guano Creek in the central portion of WSA.Within the area recommended suitable under the partial (preferred) alternative. The canyon meanders through lowsage and juniper-covered draws in this part of the WSA. July 1984.

Guano Creek WSA, OR-1-132. Guano Creek as it runs through the large basin on the east side of the WSA. Within the area recommended suitable under the partial (preferred) alternative. Riparian zones such as this are important wildlife habitat in this region. July 1984.

Appendix to the Wilderness Environmental Impact Statement for Oregon

Spaulding Wilderness Study Area (OR-1-139)

General Description of Study Area

The Spaulding wilderness study area (WSA) is 18 miles east of the small town of Adel, Oregon, adjacent to Oregon State Highway 140 (see map 1). The WSA is approximately 120 miles east of Klamath Falls, Oregon, in Harney and Lake Counties.

The area contains 69,530 acres of public land and 120 acres of private land (see map 2). In addition, 320 acres of private land are located along a dead-end road leading to Spaulding Reservoir. The 320 acres are not inside the WSA because the WSA boundary extends up the dead-end road and around the private parcel, but the parcel is surrounded by BLM land. Spaulding Reservoir, a stocked fishing reservoir and an important recreation resource in the Warner Lakes area, also is surrounded by, but not included within, the WSA.

The boundaries of the WSA are defined by BLM roads and State Highway 140. All lands adjacent to the WSA are public land. The WSA is 17 miles long from north to south and from 3 to 9 miles wide in a roughly oval shape, with a panhandle on the south.

The west side of the WSA runs along the base of west-facing Guano Rim on the east flank of Guano Valley. The south part of the WSA is flat to rolling low sagebrush country, with Antelope Butte the highest point. The central portion of the WSA contains Rocky and Sage Hen Canyons. The north end of the WSA has numerous depression lakes, and the east side of the WSA also contains a large erosion basin.

Vegetation consists generally of sagebrush/bunchgrass communities with some aspen groves, and scattered mountain mahogany and juniper growing at the base of some rims.

Interrelationships

Located on public land, Spaulding Reservoir is operated under a cooperative arrangement with the Oregon Department of Fish and Wildlife.

Most of the WSA is in the Beatys Butte wild horse herd management area (HMA). HMA management will not be significantly affected by any of the alternatives.

Issues

Issues relating to each WSA were raised by BLM and the public during the wilderness inventory and EIS planning and scoping process. These issues concern both the effects of wilderness designation on existing and potential land uses or resources in the WSA, as well as the effects of existing and potential land uses or resources on wilderness values. Land uses or resources raised as issues specifically for this WSA include:

- vehicle access to Spaulding Reservoir for fishing;
- hunting in the area, particularly the effect of closing ways on hunting; and
- continued maintenance of the dam at Spaulding Reservoir.

Description of Alternatives

The following alternatives are analyzed:

- all wilderness
- partial
- no wilderness/no action (preferred alternative)

An enhanced wilderness alternative is not analyzed because the effects of such an alternative would not be significantly different from those of the all wilderness alternative.

All Wilderness

The all wilderness alternative would recommend all 69,530 acres of public land in the WSA suitable as wilderness (see map 2). The dead-end road to Spaulding Reservoir would remain open, and maintenance of the dam would continue. The dead-end road to Spaulding Reservoir would be left open to vehicles to serve as access for wilderness users as well as for fishing at Spaulding Reservoir. For purposes of analysis, it is assumed the 440 acres of private inholdings would not be acquired under this alternative.

Partial

The partial alternative would recommend 34,800 acres suitable as wilderness and 34,730 acres as nonsuitable (see map 3). The recommended suitable area constitutes roughly the northern half of the WSA and would be bounded on the south by a way (a vehicle route established and maintained solely by the passage of vehicles), running from the "potholes" area northwest through Rocky Canyon to the floor of Guano Valley. The boundary would then run northward to private land at Spaulding Ranch where it would follow a fence and way north for about 2 miles and then follow section lines east and north the Buckaroo Pass road.

The suitable area has outstanding opportunities for solitude and primitive recreation. It incorporates the more topographically diverse portion of the WSA and the areas of highest scenic interest.

The nonsuitable portion is the site of some proposed vegetative manipulation projects to increase livestock forage and improve the condition of antelope and their habitat. It also is a popular antelope hunting area; hunters drive vehicles on ways to find the antelope.

No Wilderness/No Action (Preferred Alternative)

The no wilderness/no action alternative would recommend the entire WSA nonsuitable as wilderness. It represents the situation most likely to occur without wilderness. The area would be managed according to the current land use plan, which includes the following features relevant to this analysis:

- implementation of proposed livestock and wildlife improvement projects, including water developments and vegetative manipulation,

- continued availability for mineral exploration and development, and

- continued off-road vehicle use and stocking of fish at Spaulding Reservoir.

Table 1 summarizes the proposed management of the WSA under each alternative.

Table 2 summarizes the environmental consequences of each alternative.

Manageability of the Area as Wilderness

The areas recommended suitable for wilderness in the all wilderness and partial alternatives would be manageable as wilderness. The south part of the WSA under the all wilderness proposal would require extra patrol efforts during hunting season to prevent vehicle incursions.

Table 1. Summary of Proposed Management Under Each Alternative, Spaulding WSA (OR-1-139)

Proposed Management	All Wilderness	Partial	No Wilderness/ No Action
Acres Designated as Wilderness	69,530	34,800	0
Acres Closed to ORVs by Wilderness Designation	69,530	34,800	0
Miles of Ways Closed	13	2.5	0
Acres Withdrawn from Mineral Location and Leasing by Wilderness Designation	69,530	34,800	0
Structural Wildlife Projects Developed: Catchments & Guzzlers (numbers)	0-2	0-2	2
Vegetative Manipulation for Wildlife: Brush Control with Seeding (acres)	0	660	1,500
Structural Livestock Projects Developed:			
Reservoirs & Waterholes (numbers)	0-7	2-7	7
Pipelines (miles)	0-2	2	2
Fences (miles)	0-7	0-7	7
Vegetative Manipulation for Livestock:			
Brush Control with Seeding (acres)	0	895	2,177
Brush Control without Seeding (acres)	0	0	410

Rationale for Selection fo the Preferred Alternative

The no wilderness/no action alternative is preferred because the benefits of retaining options for increasing livestock forage production, improving the condition of antelope habitat, and exploration for and development of mineral resources, would outweigh the benefits of preserving the area's wilderness values.

Affected Environment

This section discusses only those activities or resources that influence the character of the study area, or that may be affected by the alternatives.

Wilderness Values

Naturalness

The vast majority of the WSA is in a natural condition. The area's naturalness is particularly striking because of the area's large size and large open areas, especially in the north and northeast portions of the WSA where no man-made disturbance can be seen. Evidence of past human activities is extremely isolated and scattered.

The WSA contains two spring developments, 5 miles of fence, 11 waterholes and small reservoirs, one large reservoir (Spaulding) and 13 miles of ways. Even the largest of the developments, Spaulding Reservoir and the road to it, do not significantly affect the naturalness of the WSA due to the topography and vegetative cover which effectively screen them. Man-made features within the WSA influence about 1 percent of the WSA. (The area of influence is an estimate of the acreage in the WSA from which these man-made features can be seen.)

The developments are so scattered that a person on foot would not sense any concentration of man-made features. Most of the developments are separated from each other by 2 or more miles. The lakebed waterholes are well masked and blend well into the general environment. The only fence in the WSA is located near Spaulding Ranch. The fence is well masked from either side by sagebrush, but is noticeable along its alignment.

Opportunities for Solitude or Primitive and Unconfined Types of Recreation

Outstanding opportunities for solitude exist throughout most all the WSA. The only areas where solitude is limited are the south tip of the WSA from Antelope Butte to State Highway 140 and the immediate vicinity of Spaulding Reservoir. The northern and eastern parts of the WSA have more than adequate topography that provides outstanding opportunities for solitude. The south part of the WSA on the lower rolling sagebrush flats from Antelope Butte north to Rocky Canyon appear rather open, but even in this area visitors would have adequate opportunity for isolation from others. The large size of the WSA adds to the opportunity to experience solitude.

Potential for primitive recreation is outstanding in most of the WSA. Opportunities for day hiking, backpacking, camping, nature study, photography, general sightseeing, horseback riding and hunting are excellent. Sage Hen Canyon is a rugged and scenic area for hiking. Chimney Rock on the east side of the WSA is an interesting geologic feature noted on maps of the area.

Table 2. Summary of Environmental Consequences of Alternatives, Spaulding WSA (OR-1-139)

Resource or Activity	All Wilderness	Partial	No Wilderness/No Action (Preferred Alternative)
Wilderness Values	Would add 69,530 acres to NWPS and preserve natural values in entire WSA, including native plant communities, lakebeds, and Sage Hen Canyon. Closure of 13 miles of ways would allow ways to revegetate, increase the areas naturalness, and enhance opportunities for solitude and primitive recreation. The area would be manageable as wilderness.	Would add 34,800 acres to NWPS. 34,730 acres recommended nonsuitable. Effects in suitable area same as all wilderness. Nonsuitable area in south half of WSA would be subject to developments adversely affecting wilderness values. Closure of 2 1/2 miles of ways in suitable area would increase area's naturalness and enhance opportunities for solitude and primitive recreation. The area would be manageable as wilderness.	Potential mineral, livestock and wildlife developments in scattered pattern could adversely affectmost of WSA.
Energy and Mineral Development	Mineral development precluded on 69,530 acres, including 69,530 acres with moderate potential for gold, silver, mercury and bentonite, and 21,500 acres with moderate potential for diatomite.	Development precluded on 34,800 acres including 34,800 acres with moderate potential for gold, silver, mercury and bentonite, and 16,500 acres with moderate potential for diatomite.	No impact.
Vegetation	Vegetation preserved.	Vegetation preserved in suitable area. Vegetation converted from native range to crested wheatgrass on 1,225 acres, reducing vegetative diversity.	Vegetation converted from native range to crested wheatgrass on 3,700 acres, and burning to temporarily reduce brush and forb cover on 400 acres. Both actions would temporarily reduce vegetative diversity. Impacts to vegetation outside of projects could occur due to changes in livestock use.
Wildlife	Wildlife habitat preserved. Potential of 1,500 acres of antelope habitat improvement through burn-and-seed would be precluded. Guzzlers might be precluded. No net change expected in wildlife numbers.	Wildlife habitat preserved in suitable area. 660 acres of habitat improvement through burn-and-seed. Guzzlers might be precluded. No net change in wildlife numbers expected.	Habitat improvement through burn-and-seed on 1,500 acres. No net change in wildlife numbers expected.
Livestock Grazing	Potential increase of 776 AUMs foregone. Opportunity to provide better distribution of livestock by constructing fences and water projects might be foregone.	Potential increase of 539 AUMs foregone. An additional 237 AUMs realized as a result of development. Fence, pipeline and reservoirs might not be allowed, potentially foregoing the opportunity to better distribute livestock.	776 AUM increase and opportunity to provide better distribution of livestock realized.
Recreation Use	Adverse impact on vehicle-oriented use, offset by increase in primitive recreation. No significant change in overall use.	Slight adverse impact on vehicle use, balanced by increased primitive recreation. No significant change in overall use.	No change.
Economic Value and Local Income	Decrease in annual economic value could range from $5,678 to $159, depending on what proposed projects would be allowed in wilderness. Local personal income would not change. Excludes unknown economic effects of mineral development and unquantified changes in recreation use. The maximum increase in transportation costs to livestock operators with grazing permits would be $157.	Decrease in annual economic value could range from $4,097 to $231, depending on what proposed projects would be allowed in wilderness. Local personal income would increase by $2,434. Excludes unknown economic effects of mineral development and unquantified changes in recreation use. The maximum increase in transportation costs to livestock operators with grazing permits would be $157.	Decrease in economic value by $3,883 and increase in local personal income by $7,970 from construction of proposed projects.

Special Features

Guano Rim is one of a series of high fault block scarps responsible for the distinctive basin and range topography of southeastern Oregon. The rim has potential for having a moderately dense nesting area for raptors. The WSA contains a number of sage grouse strutting grounds. The southern half of the area is crucial antelope winter range and kidding grounds.

Diversity in the National Wilderness Preservation System (NWPS)

According to the Bailey-Küchler system of classifying ecosystems, the Spaulding WSA is located in the Intermountain Sagebrush Province, with a potential natural vegetation of sagebrush steppe. Vegetative communities listed by the Oregon Natural Heritage Plan in the Basin and Range section and occurring in the WSA include big sagebrush/Idaho fescue, low sagebrush/Idaho fescue, low sagebrush/Sandberg's bluegrass, silver sagebrush, aspen groves, and mid- to high-elevation vernal (spring) ponds.

Other communities in the WSA include a willow-grass community, in a riparian area, and big sagebrush/Thurber's needlegrass community.

The WSA is within 5 hours' driving time of four standard metropolitan statistical areas with population over 100,000: Medford, Oregon; Reno, Nevada; Boise, Idaho; and Redding, California.

Energy and Mineral Development

Energy and mineral resources were evaluated by BLM using geologic data in BLM files and data provided in a report by TERRADATA, a consulting firm under contract with BLM. The TERRADATA report is titled "Assessment of Geology, Energy, and Minerals Resources of the Guano Valley Geologic Resource Area."

The Spaulding WSA is within the Guano Valley geologic resource area which has been classified according to a rating system that indicates both the potential for occurrence (geologic favorability) of certain minerals, as well as the quantity and quality of data on which the rating is based (confidence level). A description of the rating system is provided in the Statewide EIS volume.

The entire WSA is considered moderately favorable for mercury, gold and silver because of its proximity to the Eugene-Denio Lineament, and the presence of Tertiary siliceous volcanic rocks that, in other areas, exhibit epithermal (low-temperature) mineralization.

The northern half and southern tip of the WSA are moderately favorable for the occurrence of diatomite, and the entire WSA is moderately favorable for the occurrence of bentonite. These classifications are based upon the presence of formations that contain, or are likely to contain, diatomite or bentonite. These types of formations are fairly widespread over eastern Oregon. Geologic favorability for mercury, a strategic mineral, is rated moderate; however, no known deposits of strategic and critical minerals are located in the WSA.

Table 3 gives the mineral potential classifications for the WSA. Map 4 shows the portion of the WSA rated moderate (medium) for diatomite.

Except for some road material quarry sites, there are no known mineral deposits within a 10-mile radius of the WSA. As of January 1, 1984, there were no mining claims and no oil and gas or geothermal leases in the WSA.

The WSA is characterized by continental Tertiary and Tertiary to Quaternary volcanic flows, shallow intrusives, volcanically derived sedimentary rocks, and playas and lake deposits. Very little is known about the subsurface geology; pre-Tertiary marine

Table 3. Classification of Energy and Mineral Potential, Spaulding WSA (OR-1-139)

Commodity	Area	Classification Level	Confidence Level
Metals (gold, silver, mercury)	Entire WSA	3	B
Geothermal	Entire WSA	2	B
Uranium/Thorium	Part of WSA (not shown on map)	2	B
	Rest of WSA	1	A
Coal	Entire WSA	2	B
Oil/Gas	Entire WSA	2	A
Limestone	Entire WSA	1	C
Bentonite	Entire WSA	3	B
Diatomite	See map 4	3	B
	Rest of WSA	1	B
Zeolites	Entire WSA	2	B

Legend:
Class 1 - Lack of indications of favorability
Class 2 - Low favorability
Class 3 - Moderate favorability
Class 4 - High favorability

Confidence Level A - Insufficient data or no direct evidence
Confidence Level B - Indirect evidence available
Confidence Level C - Direct evidence but quantitatively minimal
Confidence Level D - Abundant direct and indirect evidence

sedimentary rocks may exist at depth and if present, may contain oil and gas.

Vegetation

The WSA generally contains sagebrush/bunchgrass communities. Quaking aspen, curl-leaf mountain mahogany and western juniper occur along the rims, especially in the north end of the area. The western portion of the WSA, which is lower in elevation, consists mainly of a sagebrush/cheatgrass community, with some green rabbitbrush in the more sandy areas. Spiny hopsage, Great Basin wildrye, Indian ricegrass and creeping wildrye occur in the sandy and more alkaline areas.

Along the very northern and eastern portions of the WSA, communities of big sagebrush/Thurber's needlegrass or Idaho fescue and low sagebrush/Idaho fescue or Sandberg's bluegrass occur. Lakebeds contain spikerushes, rushes, leafy arnica, and Schouler's plagiobothrys in the moister areas, with silver sagebrush, mat-muhly and tansy-leaved evening primrose in the drier areas.

The southern end of the WSA contains extensive low sagebrush/Sandberg's bluegrass communities.

The potholes along Sage Hen Canyon contain silver sagebrush, low sagebrush, mat-muhly, Nevada bluegrass, balticrush and small-flowered penstemon. Pristine areas along Sage Hen Canyon contain sedges, rushes, California oatgrass, Cusick's bluegrass, Junegrass and Geyer's onion.

The vegetative communities vary from early seral in the sagebrush/cheatgrass community to late seral in the low sagebrush/Idaho fescue community. (Seral refers to a stage of ecological condition based on the difference between the present plant community and climax vegetation, the relatively stable, final stage in plant succession.)

Wildlife

All of the WSA is used by deer and antelope. Approximately half of the WSA toward the south is crucial antelope winter range and kidding grounds. Spaulding Reservoir is a stocked trout fishery. Raptors used the Guano Rim portion of the WSA which has potential as a moderately dense nesting area for raptors, though no inventory has been conducted. Sage grouse inhabit the area, and a number of strutting grounds occur in the WSA. The area also supports numerous small mammals, birds, and reptiles.

Two springs have been developed in the WSA for wildlife, Horse Spring on the south and Double Rim Spring near the northern boundary. A portion of Spaulding Reservoir has been fenced to exclude livestock.

Proposed habitat improvement projects include several burn-and-seed projects for antelope, totaling 1,500 acres, and two guzzlers (small wildlife watering devices).

Livestock Grazing

All grazing in the WSA is within the Beatys Butte grazing allotment. Table 4 summarizes existing and potential grazing use in AUMs (animal unit months, the amount of forage needed to sustain one cow and a calf, or equivalent animals, for one month).

Existing livestock projects in the WSA (among the man-made features mentioned in the Naturalness section) include 5 miles of fence and 11 waterholes and reservoirs.

Proposed livestock improvements within the WSA include: 5 reservoirs and 2 waterholes, 7 miles of fence, 2 miles of water pipeline, approximately 2,177 acres of burning followed by seeding (burn-and-seed) with crested wheatgrass and 410 acres of

Table 4. Existing Livestock Use, Spaulding WSA (OR-1-139)

Grazing Allotment	Licensed AUMs in Allot.	Period of Use	Percent of Allot. in WSA	Current Actual Use in WSA (AUMs)	Potential Increase in WSA (AUMs)[1]
Beatys Butte (No. 600)	26,121	4/01-12/15	15	3,580	776

[1] Increase might or might not result in increased licensed use in the allotment (see narrative).

brush control through burning (burn-for-release). These brush control projects would lead to a potential increase in the WSA and the allotment of 776 AUMs. The fence, water pipeline, reservoirs and waterholes will help better distribute livestock within the allotment.

The road into Spaulding Reservoir is used for livestock inspection, salting and fence maintenance. Other vehicle ways in the WSA are used on occasion for livestock management but not on a regular basis.

Recreation

Fishing at Spaulding Reservoir is fairly heavy year round. The WSA is also a popular deer and antelope hunting area, particularly along the boundaries and in the south. The WSA makes up approximately 5 percent of the Beatys Butte deer hunt unit identified by the Oregon Department of Fish and Wildlife. This hunt unit receives a high amount of hunter use. The WSA comprises approximately 8 percent of the East Beatys Butte antelope unit which receives a much lower amount of hunter use; however, because the antelope congregate more in the WSA portion of the hunt unit, the share of hunters in this area would be higher than indicated by the percentage of area alone.

Hunting and fishing are the only vehicle-oriented recreation activities with a significant number of visitor days of use. Levels of primitive recreation use in the area are quite low.

Economic Conditions

Livestock grazing and recreation are the only resource outputs which generate economic activity in this WSA. The WSA currently produces 3,580 animal unit months (AUMs) of livestock forage and an unknown amount of recreation activity annually. As of January 1, 1984, there were no oil and gas leases or geothermal leases on the WSA.

The economic value of existing outputs amounts to $26,993 annually, and local personal income generated by existing outputs amounts to $36,767 annually. The terms economic value and local personal income are discussed in the Statewide EIS volume.

Environmental Consequences

This section discusses the environmental consequences of implementing each of the alternatives. Resources and activities not significantly affected by any of the alternatives are not discussed. General impact conclusions applicable to all WSAs, including impact conclusions based on speculative future developments (developments which are possible, but are not currently proposed), are discussed in the Statewide EIS volume. That volume also discusses certain assumptions that were made for this analysis.

Effects on Wilderness Values

The **all wilderness alternative** would add 69,530 acres to the National Wilderness Preservation System (NWPS). Wilderness designation would preserve, in a natural condition, a large, remote area of open low and big sagebrush country, as well as the scenic and rugged Sage Hen Canyon area. The area also includes isolated stands of aspen, mountain mahogany/juniper and several small undisturbed lakebeds. Closure of 13 miles of ways would allow the ways to revegetate, increase the area's naturalness, and enhance opportunities for solitude and primitive recreation. The dead-end road to Spaulding Reservoir would be left open to vehicles to serve as access for wilderness users as well as for fishing at Spaulding Reservoir.

The **partial alternative** would add 34,800 acres to the NWPS and preserve wilderness values on the area recommended suitable in the north half of the WSA. This portion of the WSA contains more topographic diversity and is more scenic than the area to the south. Closure of 2 1/2 miles of ways would enhance wilderness values. A small part of Guano River, the raptor habitat on the rim, and the sage grouse strutting grounds would be in the portion recommended suitable for wilderness.

The remaining 34,730 acres recommended nonsuitable for wilderness would be subject to range and wildlife development projects which would alter the natural ecosystems and reduce the area's naturalness. Increased development in this area would result in some increase in traffic related to livestock management as well as increased vehicle access for recreation. This would reduce the opportunities for primitive recreation and solitude.

Current proposals call for 895 acres of burn-and-seed as a livestock improvement project in the area recommended nonsuitable. This area would also be subject to energy and mineral development which would adversely affect naturalness and reduce opportunities for solitude and primitive recreation.

The **no wilderness/no action alternative** would allow full development of proposed livestock and wildlife projects and possible mineral development. The livestock and wildlife projects would result in approximately 4,100 acres of vegetative manipulation in several tracts across the WSA.

Range developments and increased access for recreation under this alternative would adversely affect opportunities for solitude and primitive recreation on much of the WSA because of the scattered nature of the developments and need for access to manage livestock. Naturalness of the area would also be adversely affected, because proposed projects would be located in undisturbed areas without developed access.

Effects on Energy and Mineral Development

Areas designated wilderness would be withdrawn from mineral exploration and development: 69,530 acres under the **all wilderness alternative** and 34,800 acres under the **partial alternative**. These withdrawals would include the areas rated moderate for gold, silver, mercury and bentonite, which encompass the entire WSA, and the portions rated moderate for diatomite totaling 21,500 acres; under the partial alternative, 16,500 acres of this area rated moderate for diatomite would be withdrawn.

No acreage would be withdrawn under the **no wilderness/no action alternative**.

Effects on Vegetation

Areas designated wilderness would not be subject to most surface disturbing activities. Vegetation dependent upon the existing undeveloped environment would thus be maintained.

Under the **partial alternative**, 1,555 acres of native vegetation in the nonsuitable portion would be converted to crested wheatgrass through wildlife and livestock burn-and-seed projects, reducing vegetative diversity by temporarily eliminating shrubs and forbs.

Cattle use around water developments would affect lakebed vegetation by removal and trampling and have a similar effect around the reservoir sites. Impacts to vegetation would occur outside the actual area of construction or burn-and-seed project. The projects would change livestock use patterns and, in many cases, could remove pressure on native plant communities outside the seedings. However, the projects could also lead to increased use in sensitive areas, such as aspen groves or shaded areas, which might be used by cattle drawn to the seeding for forage.

Under the **no wilderness/no action alternative**, 4,100 acres would be altered by the development of livestock and wildlife projects, including 3,700 acres of burn-and-seed and 400 acres of burn-for-release. The burn-and-seed would reduce vegetation diversity by temporarily eliminating shrubs and forbs and converting the vegetation to crested wheatgrass. The burn-for-release would also temporarily reduce vegetation diversity by reducing brush cover and forbs and increasing grasses.

Effects on Wildlife

Wildlife habitat would be preserved in areas designated wilderness.

Under the **all wilderness alternative**, the burn-and-seed projects would not be allowed, foregoing the opportunity to improve 1,500 acres of antelope habitat.

The guzzlers might or might not be allowed, depending on a site-specific assessment of whether they conform with Wilderness Management Policy. Precluding the developments and continuation of current conditions could lead to some losses during stress periods, but wildlife populations during normal years would not be affected.

Under the **partial alternative**, some 660 acres of burn-and-seed would improve antelope habitat, diminishing losses on stress years. The guzzlers might not be allowed. If not allowed, the opportunity to improve antelope habitat would be foregone.

Under the **no wilderness/no action alternative**, antelope habitat would improve as a result of 1,500 acres of burn-and-seed for antelope, diminishing losses in stress years. Guzzlers would further improve antelope habitat.

Effects on Livestock Grazing

The **all wilderness alternative** would preclude the proposed vegetative manipulation projects on a total of some 2,587 acres; a potential increase of 776 AUMs of livestock forage in the area would be foregone.

The proposed water projects might or might not be built under the all wilderness alternative, depending on a site-specific analysis to determine if they conform with Wilderness Management Policy. If not built, the opportunity to improve livestock distribution will be foregone. Use of vehicles for livestock management would be prohibited, unless there were no practical alternatives.

All of the projects have an overall benefit/cost ratio of at least 1:1.

Under the **partial alternative**, a potential increase in forage production of 539 AUMs through vegetative manipulation would be foregone. This alternative could also affect seven miles of proposed fence, two miles of pipeline and five reservoirs, which might not be allowed under wilderness management. If not built, the opportunity to better distribute livestock use will be foregone. Some 410 acres of burn-for-release would be allowed, providing 237 additional AUMs of licensed forage within the allotment.

The **no wilderness/no action alternative** would allow all proposed improvements which would provide an increase of 776 AUMs of licensed forage within the allotment and allow better distribution of livestock.

Effects on Recreation Use

All of the alternatives would leave open the dead-end road into Spaulding Reservoir, which would retain the fishing opportunity currently available there.

Under the **all wilderness alternative**, exclusion of vehicles from the study area would lead to only slight changes in deer hunting, as favorable deer habitat occurs fairly close to boundary roads. The southern end of the WSA is heavily hunted for antelope and the all wilderness alternative would change this activity from a vehicle-oriented to a primitive recreation activity.

As the WSA represents a small percentage of the antelope hunt unit, although a somewhat larger percentage of actual hunting use, hunting would not be expected to decline. With the restriction of vehicles, the number of visitor days could decline a small amount. Increases in primitive recreation use in the area as a whole would likely offset this reduction.

The **partial alternative** would not significantly affect vehicle-oriented antelope hunting as the majority of antelope hunting occurs in the area recommended nonsuitable in this alternative.

The **no wilderness/no action alternative** would have no effect on vehicle-oriented recreation and a slight adverse impact on primitive recreation, under present low use levels and current limited season of use.

No significant change in overall recreation use is expected under any of the alternatives.

Effects on Economic Value and Local Income

The economic effects for the alternatives are presented in tables 5 and 6. Table 5 shows the effects on economic value and table 6, the effects on local personal income. It is not known at this time whether individual proposed structural developments, such as the reservoir proposed for this WSA, would be constructed if the area were designated wilderness. It is known that vegetative manipulation projects, such as the proposed burn to control sagebrush, would not be allowed.

The columns for the wilderness alternatives show the effects as a range of values dependent upon whether structural improvements, and/or grazing operator access, were allowed.

Currently, there is little dependence on vehicles for livestock management in the study area. The wilderness alternatives would restrict such vehicle use unless there were no practical alternative. The maximum impact from road closures upon the grazing operator in the WSA would be an increase in cost of about $157 per year.

Table 5. Effects of Alternatives on Annual Economic Value, Spaulding WSA (OR-1-139) (1981 price levels)

Item	Unit of Measure	All Wilderness	Partial	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS				
Grazing:				
Investment[1]	AUM	0	+237	+776
VALUE OF PLANNED INVESTMENTS[2]				
Grazing	$	0	+1,787	+5,851
Investments[3]	$	0 to -5,521	-1,861 to -5,727	-9,734
Net Economic value[4]		-5,521 to 0	-3,940 to -74	-3,883
VALUE OF OTHER EXPECTED CHANGES IN OUTPUTS				
Reduced access[5]	$	-157	-157	0
VALUE OF TOTAL EXPECTED CHANGES IN OUTPUTS				
All categories	$	-5,678 to -157	-4,097 to -231	-3,883

[1] Expected future increases due to range improvement investments.

[2] Vegetative manipulation projects involving up to $42,293 total expenditures, and structural project involving $68,520. Amounts shown in the table represent combined results of both types of projects, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

[3] Average annual cost of investment expenditures amortized at 7.8% over 50-year period.

[4] For alternatives reflecting a range of negative net values (i.e., investment costs exceeding benefits), the figures are reversed to show the larger negative value as the lower end of the range (e.g., -20 to 0) so that the summation of effects for all categories in each column will show the full range of potential.

[5] Additional cost (shown as negative value) due to restriction of vehicular access for livestock operator.

Table 6. Effects of Alternatives on Local Personal Income, Spaulding WSA (OR-1-139) (1981 price levels)

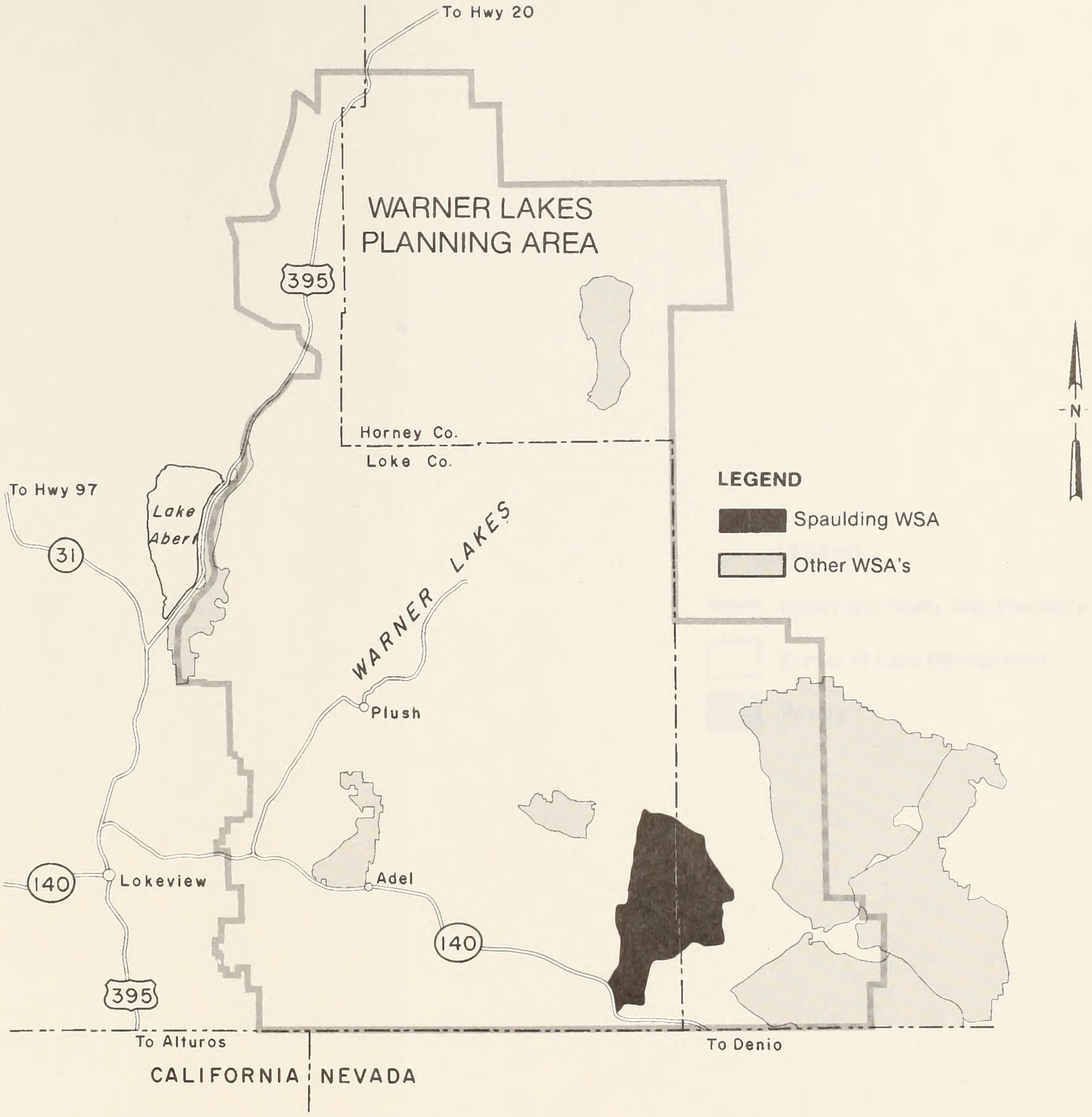
Item	Unit of Measure	All Wilderness	Partial	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS				
Grazing:				
Investment[1]	AUM	0	+237	+776
INCOME FROM PROPOSED INVESTMENTS[2]				
Grazing	$	0	+2,434	+7,970
Investments[3]	$	0 to +8,471	+2,856 to +8,789	+13,701
Total[4]	$	0	+2,434	+7,970

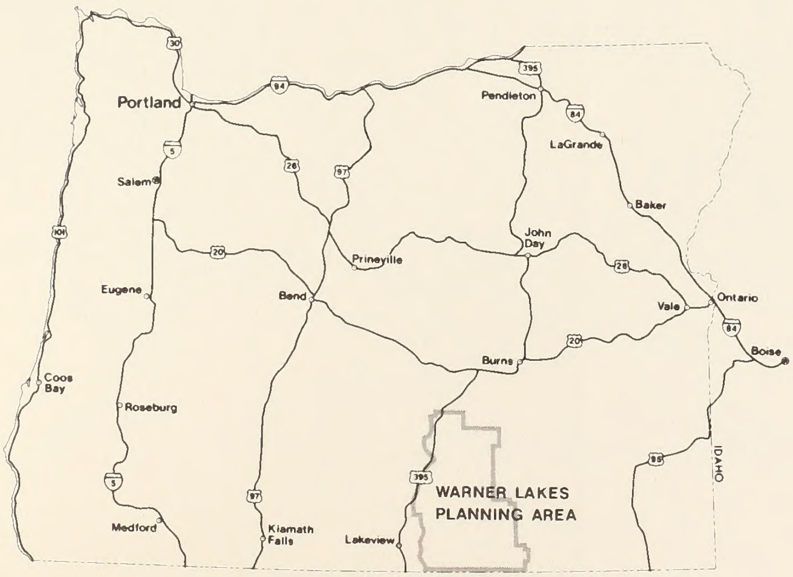
[1] Expected future increases due to range improvement investments.

[2] Vegetative manipulation projects involving up to $42,293 total expenditures, and structural project involving up to $68,520. Amounts shown in the table represent combined results of both types of projects, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

[3] Local personal income generated annually during assumed 5-year construction period. This amount cannot be added to the income resulting from grazing and hunting activity because it is not sustained over the analysis period.

[4] Detail may not sum to "Total" due to rounding. Total omits income from construction which is limited to 5-year period. See footnote 3.





U. S. Department of the Interior
Bureau of Land Management

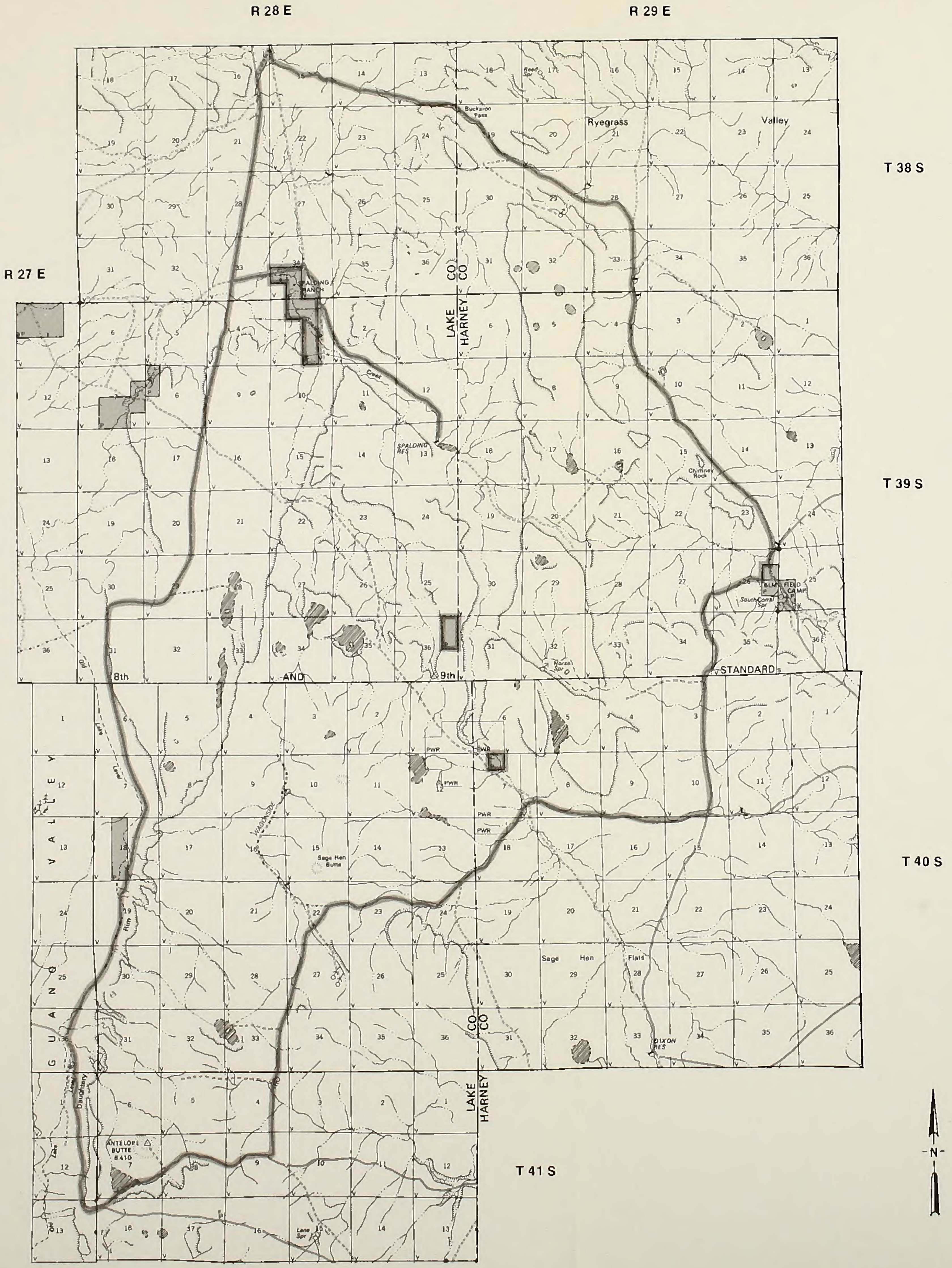
Lakeview District

Spaulding WSA
OR-1-139

LOCATION MAP

10 0 10 MILES

MAP 1



LEGEND

▬ Wilderness Study Area Boundary

☐ Bureau of Land Management

▨ Private

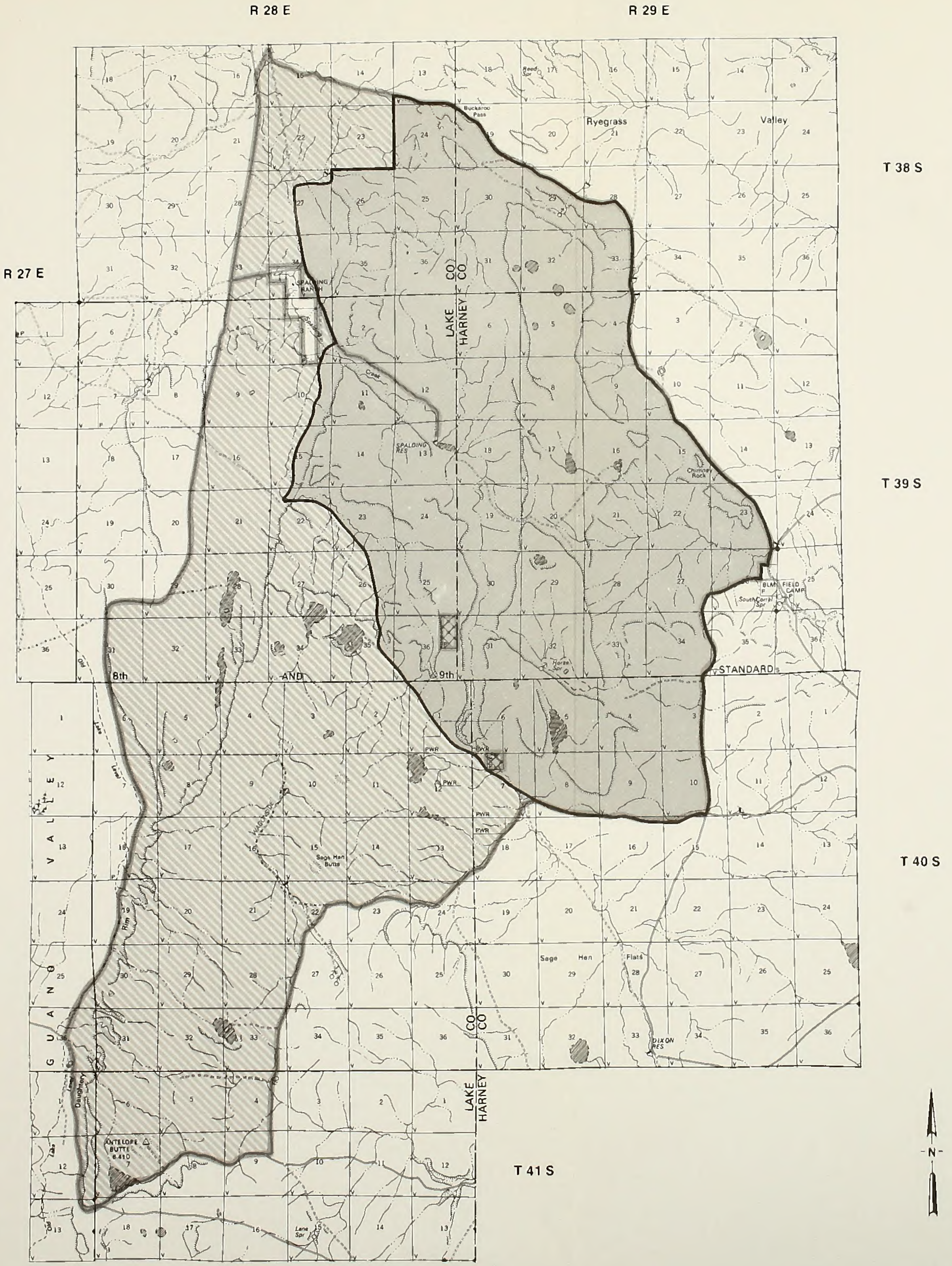
U. S. Department of the Interior
Bureau of Land Management
Lakeview District

Spalding WSA
OR 1-139

LAND OWNERSHIP

1 0 1 2 MILES

MAP 2



LEGEND

▬ Wilderness Study Area Boundary

☐ Recommended Suitable for Wilderness

▨ Recommended Non-suitable for Wilderness

▩ Non-Federal Land within Recommended Wilderness

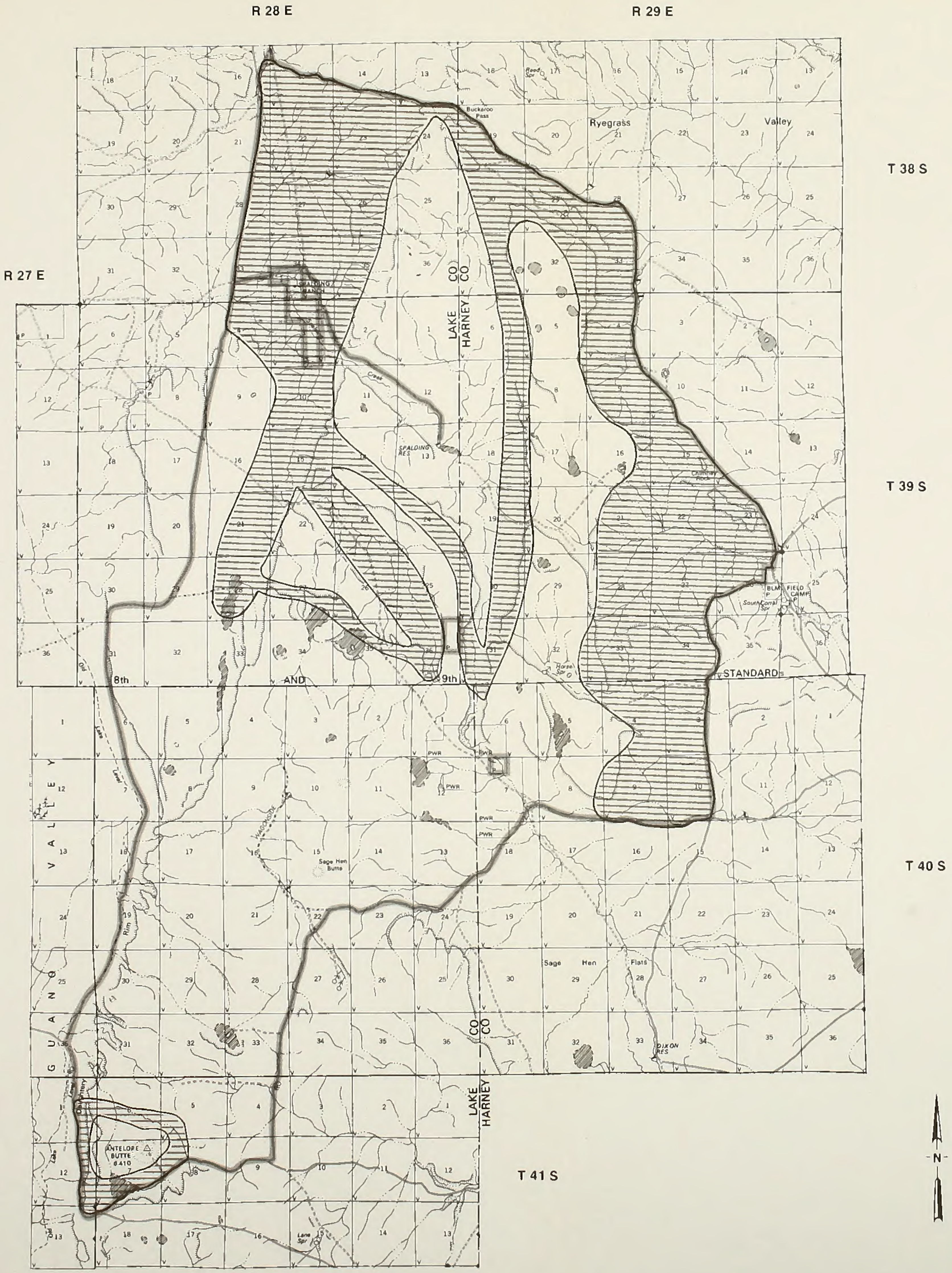
U. S. Department of the Interior
Bureau of Land Management
Lakeview District

Spaulding WSA
OR 1-139

PARTIAL ALTERNATIVE

1 0 1 2 MILES

MAP 3



Entire WSA:
Medium Potential
(3B) for Mercury, Gold, Silver
and Bentonite

▤ **Medium Potential (3B) for Diatomite**

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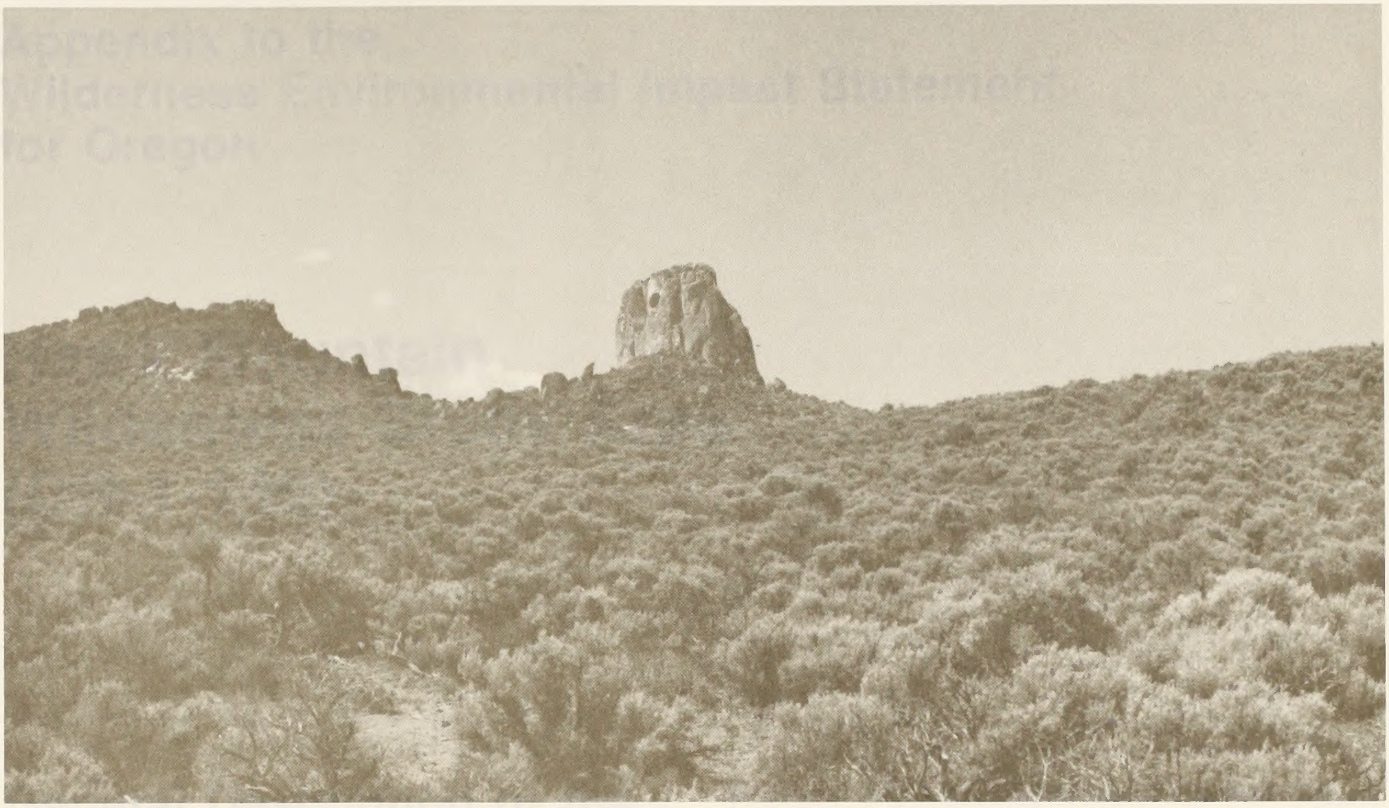
Spaulding WSA
OR 1-139

MEDIUM OR HIGH POTENTIAL MINERAL OR ENERGY RESOURCES

1 0 1 2 MILES

MAP 4



Spaulding WSA, OR-1-139. Chimney Rock on the east boundary of the WSA. Within the area recommended nonsuitable under the preferred (no wilderness/no action) alternative and suitable under the partial alternative. August 1980.

Spaulding WSA, OR-1-139. Near the south end of Sagehen Canyon at the "potholes" looking north. Within area recommended nonsuitable under the partial and preferred (no wilderness/no action) alternatives. June 1983.

Appendix to the Wilderness Environmental Impact Statement for Oregon

Hawk Mountain Wilderness Study Area (OR-1-146)

General Description of the Study Area

The Hawk Mountain wilderness study area (WSA) is located in southern Harney County, Oregon, approximately 73 miles east of Lakeview, Oregon (see map 1). The closest highway is State Highway 140, five miles southwest of the WSA.

The study area contains 68,360 acres of public land (see map 2). In addition, there are two sections of split-estate land (federally managed surface, state or privately owned subsurface mineral rights) totaling 1,280 acres in the east part of the WSA. Two-thirds of the WSA is located in BLM's Lakeview District and the remainder in the Burns District. Most of the adjacent lands are public except for some private lands along the northern boundary at Acty Mountain. A dead-end road extends 2 1/4 miles to a horse trap near the northwest corner of the WSA, forming a part of the boundary. The Sheldon National Antelope Refuge in Nevada forms the southern boundary of the WSA.

The west side of the WSA is characterized by low rolling sagebrush hills grading eastward into the steeper ridges and peaks at Acty, Hawk, and Lone Juniper Mountains. The center of the WSA contains a large, flat, dry lake basin called Hawksie Walksie. Water accumulates in this shallow lake bed in the spring but dries up fairly early in the summer.

Elevation ranges from 5,600 feet in Hawksie Walksie to 7,234 feet at the top of Hawk Mountain.

Vegetation in the WSA is primarily big sagebrush/bunchgrass communities with some low sagebrush flats on the western edge of the WSA and mountain shrub communities on the northern slopes of the hills. Tree species are limited to scattered junipers and one grove of mountain mahogany.

Interrelationships

Adjoining the Hawk Mountain WSA across the east boundary road is the Rincon WSA (2-82H).

The Pueblo-Lone Mountain grazing allotment embraces part of the Hawk Mountain WSA, the adjacent Rincon WSA, and two others, Basque Hills (OR-2-84) and Pueblo Mountains (OR-2-81) WSAs. Proposals to construct range improvements in the Hawk Mountain WSA are related to grazing management in the other three WSAs.

To the south is Big Springs Table Unit (65,600 acres), an administratively endorsed wilderness proposal on the Charles Sheldon National Antelope Refuge in Nevada. The Big Springs Table Unit provides the bulk of the winter range for the interstate antelope herd during severe winters and is the only area on the Sheldon Range to perform this function. This area is also entirely within a wildlife reserve classification with lifestock excluded.

Some 420 acres of the 440-acre Long Draw Research Natural Area (RNA), lie within the Long Draw area near the eastern border of the WSA (see map 2). The RNA was designated to protect an excellent stand of Indian ricegrass and needle-and-thread grass. The remaining portion of the RNA lies within the Rincon WSA. the RNA designation and the protection it affords would continue to apply regardless of whether or not the area is designated wilderness.

The western half of the WSA is in the Beatys Butte wild horse herd management area (HMA). HMA management will not be significantly affected by any of the alternatives.

Issues

Issues relating to each WSA were raised by BLM and the public during the wilderness inventory and EIS planning and scoping process. These issues concern both the effects of wilderness designation on existing and potential land uses or resources in the WSA, as well as the effects of existing and potential land uses or resources on wilderness values.

The only issue raised by the public was how a proposed pipeline along Long Draw on the east boundary of the WSA would affect the plant species, Cryptantha propria, and its habitat as well as the high-quality native plant communities of the WSA. Although noted, impacts to the plant, Cryptantha propria, are not analyzed, since this EIS addresses only species of "special interest," which are considered to be those that are federally listed as threatened or endangered, or candidates for federal listing, or on Lists 1 or 2 of the Oregon Natural Heritage Plan's "Rare, Threatened and Endangered Plants and Animals of Oregon."

Description of the Alternatives

The following alternatives are analyzed:

- all wilderness (preferred alternative)
- partial
- no wilderness/no action

An enhanced alternative which would combine the Hawk Mountain WSA with the Rincon WSA to the east by closing the road between the two WSAs is not analyzed because of the importance in keeping the road between the WSAs open. In addition, acquisition of the split-estate inholdings is not analyzed under a separate enhanced alternative, since the affects of such an alternative would not differ substantially from those analyzed in the all wilderness alternative. Although, for analysis purposes, the all wilderness alternative does not recommend acquisition of inholdings, selection of the all wilderness alternative as the preferred alternative does not preclude future consideration for acquisition should Congress designate the area as wilderness.

All Wilderness (Preferred Alternative)

The all wilderness alternative would recommend all 68,360 acres of public land in the WSA suitable as wilderness (see map 2). For purposes of analysis, this alternative assumes the two sections of split-estate would not be acquired, and the dead-end road into the horsetrap in the WSA near the western border would remain open.

Partial

The partial alternative would recommend 41,000 acres in the eastern part of the WSA suitable as wilderness (see map 3). In addition, an attempt would be made to acquire the 1,280 acres of split-estate within the area recommended suitable. These parcels could be acquired through purchase or exchange with willing owners. Assuming acquisition of these parcels, total area recommended suitable under this alternative would be 42,280 acres.

The western portion of 27,360 acres would be recommended nonsuitable. The western boundary of the portion recommended suitable would be formed by the dead-end road into the horsetrap and the way (a vehicle route established and maintained solely by the passage of vehicles) running by Rastus Waterhole above the north end of Hawksie Walksie lakebed. The boundary would then run along the eastern edge of the Hawksie Walksie Basin south to the way along the north end of Big Spring Table and south to the Nevada border.

No Wilderness/No Action

The no wilderness/no action alternative would recommend the entire WSA nonsuitable as wilderness. It represents the situation most likely to occur without wilderness designation. The area would be managed according to the current land use plan, which includes the following features relevant to this analysis:

- continued availability for mineral exploration and development,
- implementation of wildlife projects involving vegetative manipulation (burning followed by seeding with crested wheatgrass), and
- construction of livestock projects, including water developments (reservoirs, pipelines).

Table 1 summarizes the proposed management of the WSA under each alternative.

Table 2 summarizes the environmental consequences of each alternative.

Table 1. Summary of Proposed Management Under Each Alternative, Hawk Mountain WSA (OR-1-146)

Proposed Management	All Wilderness	Partial	No Wilderness/ No Action
Acres Designated as Wilderness	68,360	41,000	0
Acres Closed to ORVs by Wilderness Designation	68,360	41,000	0
Miles of Ways Closed	25	19	0
Acres of Split Estate Acquired[1]	0	1,280	0
Acres Withdrawn from Mineral Location and Leasing by Wilderness Designation	68,360	41,000	0
Vegetative Manipulation for Wildlife: Brush Control with Seeding (acres)	0	920	1,665
Structural Livestock Projects Developed:			
Reservoirs and Waterholes (number)	0-4	2	4
Pipelines (miles)	0-9	0-9	9
Vegetative Manipulation for Livestock: Brush Control with Seeding (acres)	0	0	1,665

[1] Upon acquisition, these additional lands would be incorporated into the wilderness area, closed to vehicle use, and withdrawn from mineral location and leasing.

Manageability of the Area as Wilderness

The area recommended suitable in the all wilderness and the partial alternatives would be manageable as wilderness. The southwestern boundary in the partial alternative would follow section lines, which would not be readily identifiable for visitors. Signing the boundary or moving the boundary to the way around Hawksie Walksie lakebed could alleviate some of this problem.

Rationale for the Selection of the Preferred Alternative

The all wilderness alternative is preferred because the benefits of preserving the many wilderness values in the area would outweigh the benefits of using the land in ways which would be incompatible with wilderness. One of the most notable features in the WSA is the quality and diversity of native vegetative communities not matched elsewhere in eastern Oregon. The area also offers outstanding opportunities for solitude and primitive recreation.

The area also has highly valued wildlife habitat, especially for migratory antelope herds. The wilderness values are directly related to the lack of development for intensive use.

The benefits gained from preserving these unique wilderness values would exceed the benefits of mineral development and the limited livestock and wildlife projects proposed in the WSA.

Affected Environment

This section discusses only those activities or resources that influence the character of the study area, or that may be affected by the alternatives.

Wilderness Values

Naturalness

Large, remote, and hilly, the Hawk Mountain WSA is in a natural condition. The areas immediately surrounding the WSA are also in a natural condition except for a seeding to the northeast. The naturalness of the area is represented in the quantity of native bunchgrass throughout the entire area, the diversity and condition of the native plant

Table 2. Summary of Environmental Consequences of Alternatives, Hawk Mountain WSA (OR-1-146)

Resource or Activity	All Wilderness (Preferred Alternative)	Partial	No Wilderness/No Action
Wilderness Values	Would add 68,360 acres to the NWPS and preserve the several wilderness qualities associated with a wide variety of native plant communities, high scenic qualities, wildlife and primitive recreation. The area would be manageable as wilderness.	Would add 42,280 acres to the NWPS, assuming 1,280 acres of split estate could be acquired. The more rugged terrain, dramatic scenic qualities, and RNA would be preserved. The area would be manageable as wilderness. Wilderness values associated with naturalness, sightseeing and study of native plant communities would be adversely affected in the nonsuitable portion. Mineral development in the nonsuitable portion could adversely affect wilderness values in that portion of the WSA and in parts of the suitable portion, due to sights and sounds of the development.	The several wilderness values in the WSA associated with solitude and naturalness would most likely be adversely affected by the proposed livestock and wildlife developments. Mineral development could adversely affect wilderness values in the WSA.
Energy and Mineral Development	Development precluded on 68,360 acres, including 68,360 acres with moderate potential for mercury, gold, silver, and copper, 24,000 acres with moderate potential for diatomite,3,800 acres with moderate potential for geothermal, and 600 acres with moderate potential for bentonite.	Development precluded on 41,000 acres, plus an additional 1,280 acres if the split estate is acquired, including 41,000 acres with moderate potential for mercury, gold, silver, and copper, 17,280 acres with moderate potential for diatomite, 3,800 acres with moderate potential for geothermal, and 600 acres with moderate potential for bentonite.	No impact.
Soils	Minimal impact to soils, limited to erosion from pipeline construction and associated increase in livestock use, if pipeline is allowed.	Same as all wilderness in suitable portion.	Pipeline developments and associated increase in livestock use would cause increased erosion and soil loss on the highly erodable soils in Long Draw.
Vegetation	Vegetation preserved.	Vegetation preserved in suitable area. Vegetation diversity on 920 acres in nonsuitable portion would be reduced by burn-and-seed.	Vegetation diversity on 3,300 acres could be reduced by burn-and-seed projects. Vegetation destroyed or converted to earlier seral stage in Long Draw near proposed pipeline.
Wildlife	Wildlife habitat preserved. Proposed burn-and-seed wildlife projects on 1,665 acres would be precluded which might result in a continued loss of some animals in stress years.	Wildlife habitat preserved in suitable area. Burn-and-seed on 920 acres would improve forage for deer and antelope. Burn-and-seed precluded on 745 acres, but little impact on herd numbers.	Proposed wildlife projects allowed on 1,665 acres to improve forage for wildlife, but possible sage grouse population losses.
Livestock Grazing	Burn-and-seed projects would be precluded and opportunity to increase forage by 440 AUMs foregone. If pipelines not allowed, opportunity to produce additional forage to forestall potential reductions in Pueblo-Lone Mountain allotment foregone. If Reservoir not allowed, opportunity to improve livestock distribution in Beatys Butte allotment foregone. Minor inconvenience to operators from vehicle restrictions. No significant impact on existing use.	Two reservoirs in nonsuitable portion would be built improving livestock distribution. Vehicle use not limited. Other impacts same as all wilderness.	No impact. Licensed livestock forage could be increased by 440 AUMs through projects in the Beatys Butte allotment. Pipelines in Pueblo-Lone Mountain allotment allowed, contributing 440 AUMs toward forestalling a 4000 AUM decrease in licensed use allotment wide. Vehicle use not restricted.

Table 2. Summary of Environmental Consequences of Alternatives, Hawk Mountain WSA (OR-1-146)

Resource or Activity	All Wilderness (Preferred Alternative)	Partial	No Wilderness/No Action
Recreation Use	Quality of primitive recreation preserved or improved. Vehicle-oriented hunting would shift to horseback. Increases in primitive recreation would offset vehicle-oriented reductions. No change in overall recreation use.	Would allow vehicle access to core of WSA. Livestock and wildlife projects could damage the quality of both primitive and vehicle-oriented recreation in nonsuitable portion. No change in overall recreation use.	Proposed projects would adversely affect the natural qualities associated with the scenic beauty and reduce quality of primitive and vehicle-oriented recreation. Recreation activities involving the use of vehicles in the WSA would not be limited. No change in overall recreation use.
Economic Value and Local Income	Decreases in annual economic value could range from $7,486 to $3,575 depending on what proposed projects would be allowed in wilderness. Local personal income would either decrease by $3,683 or not change, depending on the same uncertain factors. Both sets of figures exclude unknown economic effects of mineral development and unquantified changes in recreation use. The maximum increase in transportation costs to ranchers with grazing permits would be $257.	Decreases in annual economic value could range from $7,486 to $4,158, depending on what proposed projects would be allowed in wilderness. Local personal income would either decrease by $3,683 or not change, depending on the same uncertain factors. Both sets of figures exclude unknown economic effects of mineral development and unquantified changes in recreation use. The maximum increase in transportation costs to ranchers with grazing permits would be $257.	Decrease in economic value by $6,358 and increase in local personal income by $3,683.

communities, and the presence of very few developments in the WSA.

Man-made features in the WSA include approximately 25 miles of vehicle ways, one fenced spring exclosure, five small reservoirs and waterholes, and six miles of fence on the boundary between BLM's Lakeview and Burns Districts. The area influenced by these developments is less than 1.5 percent of the WSA. The developments are dispersed, small in size, and are generally visible only in the immediate vicinity. The two waterholes in the Hawksie Walksie Basin are visible from a greater distance than the other developments because they are located in a large, flat, open playa within view of the surrounding hills. Many of the ways in the WSA are revegetating naturally to native bunchgrasses and shrubs.

There are no outside sights and sounds which would influence this area, as the WSA is very remote.

Opportunities for Solitude or Primitive and Unconfined Types of Recreation

The opportunity for solitude is outstanding throughout the entire WSA. The majority of the WSA has rolling to mountainous terrain with draws, valleys, ridges, and canyons. these features are especially notable in the northern and eastern parts of the WSA. The far western portion of the WSA is much less dramatic in topography but still offers the visitor more than ample opportunity for isolation.

The size of the area contributes to ample opportunities for solitude even where topography does not offer screening. Vegetation in the area is primarily sagebrush but still offers ample screening. The fewest opportunities for solitude are found on the Hawksie Walksie lakebed, but this feature is so large that visitors would still have little occasion to notice others, unless large numbers of people were present.

The potential for a wide range of types of primitive recreation activities is outstanding. Opportunities for day hiking, backpacking, horseback riding, hunting and camping are abundant throughout the area. The eastern half of the WSA offers the more rugged and challenging hiking terrain.

Sightseeing and photographic opportunities are present throughout the WSA, which offers a diversity of form and content representative of much of the high desert country. From alkali flats to sagebrush communities to high desert peaks, the desert enthusiast can view wildlife, plants, and a variety of desert scenery. Wild horses are common on the WSA as well as antelope, deer, and numerous bird species. Views from the higher terrain are expansive and often dramatic in scope. Two areas on the east side of the WSA in Long Draw contain unique rock formations of interest to sightseers and other recreationists.

Primitive hunting opportunities for deer and antelope are good in the WSA, especially when done with horses. The WSA is particularly suited to hunting with horses due to its large size, rugged terrain, and few roads.

Special Features

The Long Draw area, located along the eastern border of the WSA, contains a number of special features. Most notable are the scenic contrasts in color of exposed soils and the various kinds of vegetation on the hills within the draw. Highly scenic eroded pinnacles occur in two areas along Long Draw.

The Long Draw area contains two uncommon vegetative communities. These communities are big sagebrush/needle and thread grass-Indian ricegrass, and winter fat. Three hundred acres of the big sagebrush/needle and thread grass community are within the Long Draw RNA. This community is in good condition, having received little livestock use.

A Wyoming big sagebrush/Thurber's needlegrass community in the southwestern portion of the WSA is being reviewed by the Pacific Northwest Research Natural Area Committee and BLM as a potential RNA. This is the best representation of this community type in the Lakeview District.

Throughout the WSA, the abundance of native bunchgrasses is notable. The diversity of native communities is exemplified in the eleven plant communities listed in the Oregon Natural Heritage Plan.

The WSA contains 25 to 35 sage grouse strutting grounds.

Diversity in the National Wilderness Preservation System (NWPS)

According to the Bailey-Küchler system of classifying ecosystems, the WSA is in the Intermountain Sagebrush Province, with a potential natural vegetation of sagebrush steppe.

Vegetative communities listed in the Basin and Range section of the Oregon Natural Heritage Plan and occurring in the WSA are: big sagebrush/Idaho fescue, big sagebrush/bluebunch wheatgrass, low sagebrush/Idaho fescue, low sagebrush/Sandberg's bluegrass, silver sagebrush, black sagebrush, bare playa and playa margins communities, winterfat, mountain mahogany in southern basin and range, bitterbrush-sagebrush/snowberry, and Indian ricegrass-needlegrass. Two other native communities which should be considered but are not included in the Natural Heritage Plan are big sagebrush/creeping wildrye grass and big sagebrush/Thurber's needlegrass.

Hawk Mountain WSA is located within 5 hours' driving time of two standard metropolitan statistical areas with populations over 100,000: Medford, Oregon; Boise, Idaho; and Reno, Nevada.

Energy and Mineral Development

Energy and mineral resources were evaluated by BLM using available geologic data and information provided in a report by TERRADATA, a consulting firm under contract with BLM. The report is titled "Assessment of Geology, Energy, and Minerals Resources of the Lone Mountain Geologic Resource Area." The WSA is within the Lone Mountain geologic resource area, which has been classified according to a rating system that indicates both the potential for occurrence (geologic favorability) of certain minerals, as well as the quantity and quality of data on which the rating is based (confidence level). A description of the rating system is provided in the Statewide EIS volume.

A portion of the WSA is rated as moderately favorable for the occurrence of geothermal energy. Because of the possibility of marine sedimentary rocks at depth, there appears to be a low favorability for the occurrence of oil and gas.

Based upon anomalous values obtained in a geochemical stream sediment survey, the position of the WSA along the Eugene-Denio Lineament, and the WSA's proximity to mineralized areas within the Sheldon National Antelope Refuge, the entire WSA is considered to have a moderate favorability for the occurrence of copper, mercury, silver and gold. This moderate rating for metals has two different confidence levels (see table 3 and map 4).

A portion of the WSA is considered moderately favorable for bentonite. There is a moderate favorability for the occurrence of diatomite in tuffaceous sedimentary deposits in a portion of the WSA. However, these deposits are widespread, and diatomite could occur in several other areas.

Table 3 shows the mineral potential classifications for the WSA. Map 4 shows the portions of the WSA rated moderate (medium) for metals, geothermal, bentonite, and diatomite.

Except for scattered road aggregate sources, there are no known mineral deposits in the WSA.

Strategic and critical minerals with a moderate favorability for occurrence are mercury, copper, and silver; but there are no known deposits of strategic and critical minerals in the WSA. As of January 1, 1984, there were no mining claims and no oil and gas or geothermal leases in the WSA.

The surface rocks of the WSA consist of Tertiary and Tertiary to Quarternary flows, breccias, tuffs, and tuffaceous sediments, and Quarternary unconsolidated alluvium and playa deposits. The subsurface geology is largely unknown, but pre-Tertiary marine sedimentary rocks may occur at depth.

Table 3. Classification of Energy and Mineral Potential, Hawk Mountain WSA (OR-1-146)

Commodity	Area	Classification Level	Confidence Level
Metals (copper, mercury, gold, silver)	See map 4	3	B
	See map 4	3	A
Geothermal	See map 4	3	B
	Rest of WSA	2	B
Uranium/Thorium	Entire WSA	1	A
Coal	Entire WSA	2	C
Oil/Gas	Entire WSA	2	B
Limestone	Entire WSA	1	A
Bentonite	See map 4	3	B
	Rest of WSA	2	A
Zeolites	See map 4	2	B
	Rest of WSA	1	A
Diatomite	See map 4	3	B
	Rest of WSA	1	B

Legend:
Class 1 - Lack of indications of favorability
Class 2 - Low favorability
Class 3 - Moderate favorability
Class 4 - High favorability

Confidence Level A - Insufficient data or no direct evidence
Confidence Level B - Indirect evidence available
Confidence Level C - Direct evidence but quantitatively minimal
Confidence Level D - Abundant direct and indirect evidence

Soils

The west half of the WSA is characterized by flat to gently sloping uplands with shallow, clayey, very stoney, and well-drained soils.

The Hawksie Walksie basin area contains soils ranging from silty, well-drained soils underlain by consolidated lake sediments to shallow, excessively drained soils underlain by hardpan.

The mountain tops of Acty and Hawk Mountains are steeply sloping with shallow, very stoney soils interspersed with rock outcrops. Below the peaks are cobbly, moderately deep soils high in organic matter.

Soils in Long Draw and to the east slope of Acty, Hawk, and Lone Juniper Mountain are coarse-textured, shallow to moderately deep soils over tuffaceous parent material. the soils in Long Draw are highly erodable where tuffaceous parent material is exposed and moderately erodable in the rest of Long Draw due to the slope.

Evidence of severe erosion exists along the east boundary road in Long Draw and on exposed tuffaceous outcrops.

Vegetation

Vegetation in the Hawk Mountain WSA is comprised mainly of sagebrush/bunchgrass communities. Even though the area is mainly sagebrush, the area contains a large diversity of communities (refer also to the preceding section, Diversity in the NWPS). Most of the vegetative communities are in a mid- to late-seral stage. (Seral refers to a stage of ecological condition based on the difference between the present plant community and climax vegetation, the relatively stable, final stage in plant succession.) Low sagebrush communities predominate in the extreme western portion of the WSA while big sagebrush/bunchgrass communities are dominant in the rest of the area.

A variety of native bunchgrasses grow in the sagebrush communities on the hills and valleys in the WSA. They include bluebunch wheatgrass, Thurber's needlegrass, June-grass, Sandberg's bluegrass, Idaho fescue, and squirreltail grass. Silver sagebrush is found in the Hawksie Walksie Basin area within squirreltail grass and creeping wildrye grass. Tree species consist of junipers which are sparsely scattered throughout the WSA and mountain mahogany which is restricted to a grove in the western portion of the WSA. The canyons contain a wide variety of shrubs such as wax currant, gland ocean-spray, snowberry, bitterbrush, serviceberry, and Wood's rose.

The very eastern end of the WSA has numerous outcrops of exposed light-colored soils where a wide variety of plant species grow in a very showy, colorful display. Some of the species include winterfat, purple sage, line-leaf fleabane, slenderbush buckwheat, and Cryptantha propria. The sandy soils in this area support excellent Indian ricegrass-needle and thread grass communities as described in the Special Features section.

Wildlife

The WSA has habitat for numerous wildlife species. Coyotes, deer, antelope, rabbits, squirrels, doves, swifts, raptors, lizards, and perching birds are some of the common, more visible species. Other wildlife species which inhabit the area during some part of the year include sagegrouse, weasels, badgers, marmots, bobcats, and possibly cougars. The western portion of the WSA contains sage grouse strutting grounds. It is estimated that 25 to 35 strutting grounds occur in the WSA with 25 to 30 birds per strutting ground. The WSA is used by antelope and deer year-round, with different herds of antelope on the WSA at different times of the year.

One spring in the northwest portion of the WSA has been minimally developed and fenced for wildlife. A wildlife improvement project for deer is proposed for the WSA, involving burning approximately 1,230 acres followed by seeding with crested wheatgrass and other species. This burn-and-seed project would be in two parcels located in the hills to the east and west of Hawksie Walksie Basin. Some 435 acres southwest of Hawksie Walksie Basin are proposed for similar treatment to benefit antelope. These projects would improve forage conditions but would not substantially alter animal numbers.

Livestock Grazing

Portions of 2 grazing allotments are within the WSA. Table 4 shows existing and potential livestock use in AUMs (animal unit months, the amount of forage needed to sustain one cow and a calf, or equivalent animals, for one month).

Table 4. Existing and Potential Livestock Use, Hawk Mountain WSA (OR-1-146)

Grazing Allotment	Licensed AUMs in Allot.	Period of Use	Percent of Allot. in WSA	Current Actual Use in WSA (AUMs)	Potential Increase in WSA (AUMs)	Potential Decrease in WSA (AUMs)
Beatys Butte (No. 0600, Lakeview District)	26,121	04/15-12/15	9	3,850	440	0
Pueblo-Lone Mtn. (No. 6020, Burns District)	22,896	04/16-10/31	8	144	0	440
Totals	48,017			3,970	440	440

Existing livestock developments in the WSA (among the man-made features listed in the Naturalness section) include five reservoirs and waterholes and six miles of fence.

Proposed livestock improvements in the WSA include 1,665 acres for burning followed by seeding with crested wheatgrass and 4 reservoirs in the Beatys Butte allotment, and 2 pipelines totaling 9 miles in the Pueblo-Lone Mountain allotment. The burn-and-seed treatments would be located just to the east of the Hawksie Walksie Basin and would produce 440 AUMs of additional livestock forage. Three of the reservoirs are in the western half of the WSA and one is to the east of Hawksie Walksie Basin. The reservoirs would improve livestock distribution but would not make additional forage available. Overall, licensed use could increase by as much as 440 AUMs as a result of the projects in the Beatys Butte allotment.

In the Pueblo-Lone Mountain portion of the study area, the pipelines would be located along the eastern edge of the WSA in Long Draw. These pipelines would improve livestock distribution and management and increase forage in the WSA portion of the allotment. The pipelines are part of a total allotment plan affecting 4 WSAs. The 4000 AUMs produced by projects throughout the allotment would not result in increased licensed use, but they would be used to offset possible reductions of 4000 AUMs allotment-wide (3,800 of which is within the 4 WSAs).

Motor vehicles are used periodically for livestock inspection, salting, and major fence maintenance. Livestock are gathered by horseback.

Recreation Use

Primitive types of recreation in the WSA include horseback riding, hunting on horseback, and hiking. Vehicle-oriented recreation is primarily related to antelope and deer hunting. Hunter camps are commonly established at Rastus waterhole and near the southeast corner of the Hawksie Walksie lakebed. Though user numbers are low in the WSA due to its remoteness, the quality of the hunting experience is very high.

Economic Value and Local Income

Livestock grazing and recreation are the only resource outputs which generate economic activity in this WSA. The WSA currently produces 3,970 animal unit months (AUMs) of livestock forage and an unknown amount of recreation activity annually. As of January 1, 1984, there were no oil and gas leases or geothermal leases on the WSA.

The economic value of existing outputs amounts to $29,934 annually, and local personal income generated by existing outputs amounts to $33,109 annually. The terms economic value and local personal income are discussed in the Statewide EIS volume.

Environmental Consequences

This section discussed the environmental consequences of implementing each of the alternatives. Resources and activities not significantly affected by any of the alternatives are not discussed. General impact conclusions applicable to all WSAs, including impact conclusions based on speculative future developments (developments which are possible, but are not currently proposed), are discussed in the Statewide EIS volume. That volume also discusses certain assumptions that were made for this analysis.

Effects on Wilderness Values

The **all wilderness alternative** would add 68,360 acres to the National Wilderness Preservation System (NWPS) and would preserve wilderness characteristics in the WSA. Opportunities for solitude associated with this large, unmodified area of rolling hills, peaks, and basin would be preserved. Wilderness designation would also preserve the abundant native plant communities, high scenic qualities, primitive recreation values, and wildlife habitat for antelope, deer and sage grouse.

The **partial alternative** would add 42,280 acres to the NWPS, assuming the 1,280 acres of split-estate could be acquired, and would maintain wilderness values in the eastern half of the WSA. This portion includes the more rugged terrain and more dramatic scenery of the WSA. It also includes the Long Draw RNA.

The partial alternative would recommend as nonsuitable 27,360 acres of land in the western part of the WSA, including Hawksie Walksie Basin and lands to the west. The majority of the sage grouse strutting grounds are located in this portion of the WSA. Proposed livestock and wildlife projects and possible mineral developments could adversely affect the area's opportunities for solitude and primitive recreation, naturalness, and native plant communities.

Sights and sounds from developments in the nonsuitable portion could adversely affect wilderness values in the suitable area to the east to some degree, depending on the location of developments.

Under the **no wilderness/no action alternative**, any mineral development could adversely affect wilderness values, including the area's special wilderness features and opportunities for solitude and primitive recreation. Some adverse effects from oil and gas or geothermal lease development could be mitigated through lease stipulations. Many wilderness values in the WSA would most likely be damaged by the proposed livestock and wildlife developments. Alteration of the high quality and diverse vegetative communities through proposed projects and developments and increased livestock use is probable. Primitive recreation values would be adversely affected by proposed projects.

Increases in roads and ways accompanying increased livestock use on the eastside of the WSA would permanently alter the natural conditions conducive to primitive recreation.

Effects on Energy and Mineral Development

Areas designated wilderness would be withdrawn from mineral exploration and development. Table 5 shows the acres that would be withdrawn under each alternative, including the acres rated moderate for various minerals.

Table 5. Effects of Alternatives on Energy and Mineral Development, Hawk Mountain WSA (OR-1-146)

	Acres Withdrawn		
	All Wilderness	Partial	No Wilderness/ No Action
Total Acres	68,360	41,000 [1]	0
Mercury, copper, gold, silver rated moderate	68,360	41,000	0
Geothermal rated moderate	3,800	3,800	0
Bentonite rated moderate	600	600	0
Diatomite rated moderate	24,000	17,280	0

[1] Development also precluded on an additional 1,280 acres if the split-estate land is acquired as proposed under this alternative.

Effects on Soils

Under the **all wilderness alternative**, impacts to soil would be associated with pipeline construction and increased livestock use (if pipeline construction is allowed). The nonsuitable portion of the **partial alternative** would be subject to soil disturbance from pipeline construction.

In the **no wilderness/no action alternative**, pipeline development and its associated increase in livestock use (where there has only been light use) could cause increased erosion and soil loss in Long Draw. Long Draw's soils are classified as highly erodable. There is evidence of severe erosion along the boundary road in the area proposed for the pipeline.

Effects on Vegetation

Areas designated wilderness would not be subject to most surface disturbing activities. Vegetation dependent upon the existing undeveloped environment would thus be maintained.

In the nonsuitable portion of the **partial alternative**, proposed burn-and-seed projects would reduce vegetative diversity on 920 acres, by temporarily eliminating shrubs and forbs and converting vegetation to crested wheatgrass. Water developments would also reduce plant cover due to livestock concentration around the waterholes.

Under the **no wilderness/no action alternative**, proposed burn-and-seed projects on 3,330 acres would reduce vegetative diversity by temporarily eliminating shrubs and forbs and converting vegetation to crested wheatgrass. Vegetative communities in Long Draw could be destroyed or converted to an earlier seral stage from proposed pipeline projects and accompanying increase in livestock use.

Effects on Wildlife

Wildlife habitat would be preserved in areas designated wilderness.

Under the **all wilderness alternative**, the proposed burn-and-seed projects for wildlife would not be allowed. Though this would not lead to any substantial change in wildlife numbers, some minor losses in stress years might continue without the projects.

The **partial alternative** would allow 920 acres of burn-and-seed for improvement of antelope and deer forage in the nonsuitable portion. Sage grouse habitat, strutting grounds and nesting cover could be reduced or eliminated with project developments for either wildlife or livestock grazing. The opportunity to burn and seed 745 acres to improve forage for antelope and deer on the east side of the WSA would be foregone. Precluding this project would have little impact on herd numbers.

Under the **no wilderness/no action alternative**, 1,665 acres of burn-and-seed for wildlife could be implemented to improve forage conditions for deer and antelope. Disturbance from wildlife and livestock projects could adversely affect sage grouse and their strutting grounds and lead to displacement or loss of grouse.

Effects on Livestock Grazing

The Hawk Mountain WSA is one of four WSAs located in the Pueblo-Lone Mountain allotment. Water developments are proposed in all four WSAs and fences and seedings in 2 WSAs. These projects would allow for shifting of livestock use from apparently overgrazed areas within the Pueblo Mountains and Rincon WSAs, and areas outside the WSAs, to areas with unused grazing capacity in the Rincon, Basque Hills, and Hawk Mountain WSAs.

Preliminary and inconclusive data show that grazing in portions of the Pueblo-Lone Mountain allotment, including portions of the Pueblo Mountains and

Rincon WSAs, could exceed the grazing capacity by 4,000 AUMs (approximately 19 percent of the total allotment). Other portions of the allotment are not grazed at all due to lack of water and fences to keep livestock confined to those areas. (The preliminary estimate of the amount of overgrazing is subject to refinement as the effects of livestock grazing in the Pueblo Mountains and Rincon WSAs are monitored.)

The fences, water developments and seedings approved for the allotment are all necessary for the implementation of a grazing system. Under such a system, pastures are developed and some are rested, deferred or grazed in cycles to allow the forage some relief from grazing during the critical growing period.

Under the **all wilderness alternative**, proposed burn-and-seed projects would not be allowed, and, at a minimum, an opportunity to increase livestock forage by 440 AUMs in the Beatys Butte allotment would be foregone. The proposed 4 reservoirs and 2 pipelines might or might not be allowed, depending upon a site-specific environmental assessment of whether the projects conform with Wilderness Management Policy. If the reservoirs are not allowed, the opportunity to improve livestock distribution in the Beatys Butte allotment would be foregone. If the pipelines are not allowed, an opportunity to produce additional livestock forage to offset potential reductions in licensed use and implement a new grazing system would be foregone. Licensed use in the Pueblo-Lone Mountain allotment could be reduced by up to 440 Aums in the absence of the pipelines and other proposed projects in the Pueblo-Lone Mountain allotment.

All of the projects have an overall benefit/cost ratio of less than 1:1.

There would be no significant impact on existing livestock use. Motor vehicle use for livestock inspection and salting could be limited, but such limitations would only present a minor inconvenience to the livestock operators.

Under the **partial alternative**, two of the proposed reservoirs would be built, as they are in the portion recommended nonsuitable. The effect of this alternative on the other two reservoirs and the two pipelines would be the same as in the all wilderness alternative. An opportunity to increase livestock forage by 440 AUMs through burn-and-seed treatments would be foregone. Motor vehicle use for livestock inspection and salting would not be restricted. Implementing projects with a present negative benefit/cost ratio would be possible in the nonsuitable portion.

Under the **no wilderness/no action alternative**, all proposed projects would be constructed. An additional 440 AUMs would become available in the Beatys Butte allotment though implementation of these projects, and would contribute 440 AUMs toward forestalling a reduction of up to 4000 AUMs of licensed use allotment wide in the Pueblo-Lone Mountain allotment. Motor vehicle use would not be limited.

Effects on Recreation Use

Under the **all wilderness alternative**, the quality of primitive recreation and the very high natural and scenic qualities would be maintained or improved. Prohibiting vehicle use would have a minor adverse impact on hunting and sightseeing, as some of the vehicle-oriented hunting use would shift to hunting by horseback and because off-road sightseeing in these areas is very limited. Overall recreation use probably would not change substantially, as increases in primitive recreation would about equal reductions in vehicle-oriented activities.

Under the **partial alternative**, the quality of primitive recreation and the very high natural and scenic qualities in the portion recommended suitable would be maintained. This alternative would allow continued vehicle access into the core of the WSA and would have less adverse impact to vehicle-oriented recreation than the all wilderness alternative. Livestock and wildlife projects could adversely affect the natural and scenic qualities associated with sightseeing and the quality of both primitive and vehicle-oriented recreation. Overall recreation use probably would not change.

The **no wilderness/no action alternative** would allow proposed projects to alter the natural qualities associated with the scenic beauty of the area and thus reduce the quality primitive and vehicle-oriented recreation. Recreation involving the use of vehicles in the WSA would not be restricted. Developments in the Long Draw area would severely reduce primitive and vehicle-oriented recreation values in this highly scenic area. Overall recreation use probably would not change.

Effects on Economic Value and Local Income

The economic effects for the alternatives are presented in tables 6 and 7. Table 6 shows the effects on economic value and table 7, the effects on local personal income. It is not known at this time whether individual proposed structural developments, such as the pipelines and reservoirs proposed for this WSA, would be constructed if the area were designated wilderness. It is known that vegetative manipulation projects, such as the proposed burn to control sagebrush, would not be allowed.

The columns for the wilderness alternatives show the effects as a range of values dependent upon whether structural improvements and/or grazing operator access were allowed.

Currently, there is little dependence on vehicles for livestock management in the study area. The wilderness alternatives would restrict such vehicle use unless there were no practical alternative. The maximum impact from road closures upon the grazing operator in the WSA would be an increase in cost of about $257 per year.

Table 6. Effects of Alternatives on Annual Economic Value, Hawk Mountain WSA (OR-1-146) (1981 price levels)

Item	Unit of Measure	All Wilderness	Partial	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS				
Grazing:				
Adjustments[1]	AUM	-440	-440	-440
Investments[2]	AUM	0 to +440	0 to +440	+880
VALUE OF PLANNED INVESTMENTS[3]				
Grazing	$	0 to +3,318	0 to +3,318	+6,635
Investments[4]	$	0 to -7,229	-583 to -7,229	-9,676
Net Economic Value[5]	$	-3,911 to 0	-3,911 to -583	-3,041
VALUE OF OTHER EXPECTED CHANGES IN OUTPUTS				
Grazing:				
Adjustments	$	-3,318	-3,318	-3,318
Reduced access[6]	$	-257	-257	0
Total	$	-3,575	-3,575	-3,318
VALUE OF TOTAL EXPECTED CHANGES IN OUTPUTS				
All categories[7]	$	-7,486 to -3,575	-7,486 to -4,158	-6,358
		(-257)	(-257)	(+870)

[1] Adjustment for possible reduction in grazing is based on inconclusive data and may not be necessary.

[2] Expected future increases due to range improvement investments.

[3] A vegetative manipulation project involving up to $30,368 total expenditures, and structural projects involving up to $89,720. Amounts shown in the table represent combined results of both types of projects, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

[4] Average annual cost of investment expenditures amortized at 7.875% over 50-year period.

[5] For alternatives reflecting a range of negative net values (i.e., investment costs exceeding benefits), the figures are reversed to show the larger negative value as the lower end of the range (e.g., -20 to 0) so that the summation of effects for all categories in each column will show the full range of potential effects.

[6] Additional cost (shown as negative value) due to restriction of vehicular access for livestock operator.

[7] See footnote 1. If the grazing adjustment is found to be unnecessary, compensating improvements would not be developed. Investments and grazing adjustments would be zero. The effects of this case are shown in parentheses.

Table 7. Effects of Alternatives on Local Personal Income, Hawk Mountain WSA (OR-1-146) (1981 price levels)

Item	Unit of Measure	All Wilderness	Partial	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS				
Grazing:				
Adjustments[1]	AUM	-440	-440	-440
Investments[2]	AUM	0 to +440	0 to +440	+880
INCOME FROM PROPOSED INVESTMENTS[3]				
Grazing	$	0 to +3,683	0 to +3,683	+7,366
Construction-activity[4]	$	0 to +12,030	+971 to +12,030	+16,101
Total[5]	$	0 to +3,683	0 to +3,683	+7,366
INCOME FROM OTHER EXPECTED OUTPUT CHANGES				
Grazing:				
Adjustments	$	-3,683	-3,683	-3,683
INCOME FROM ALL OUTPUT CHANGES				
All categories[5] [6]	$	-3,683 to 0 (0)	-3,683 to 0 (0)	$3,683 ($3,683)

[1] Adjustment for possible reduction in grazing is based on inconclusive data and may not be necessary.

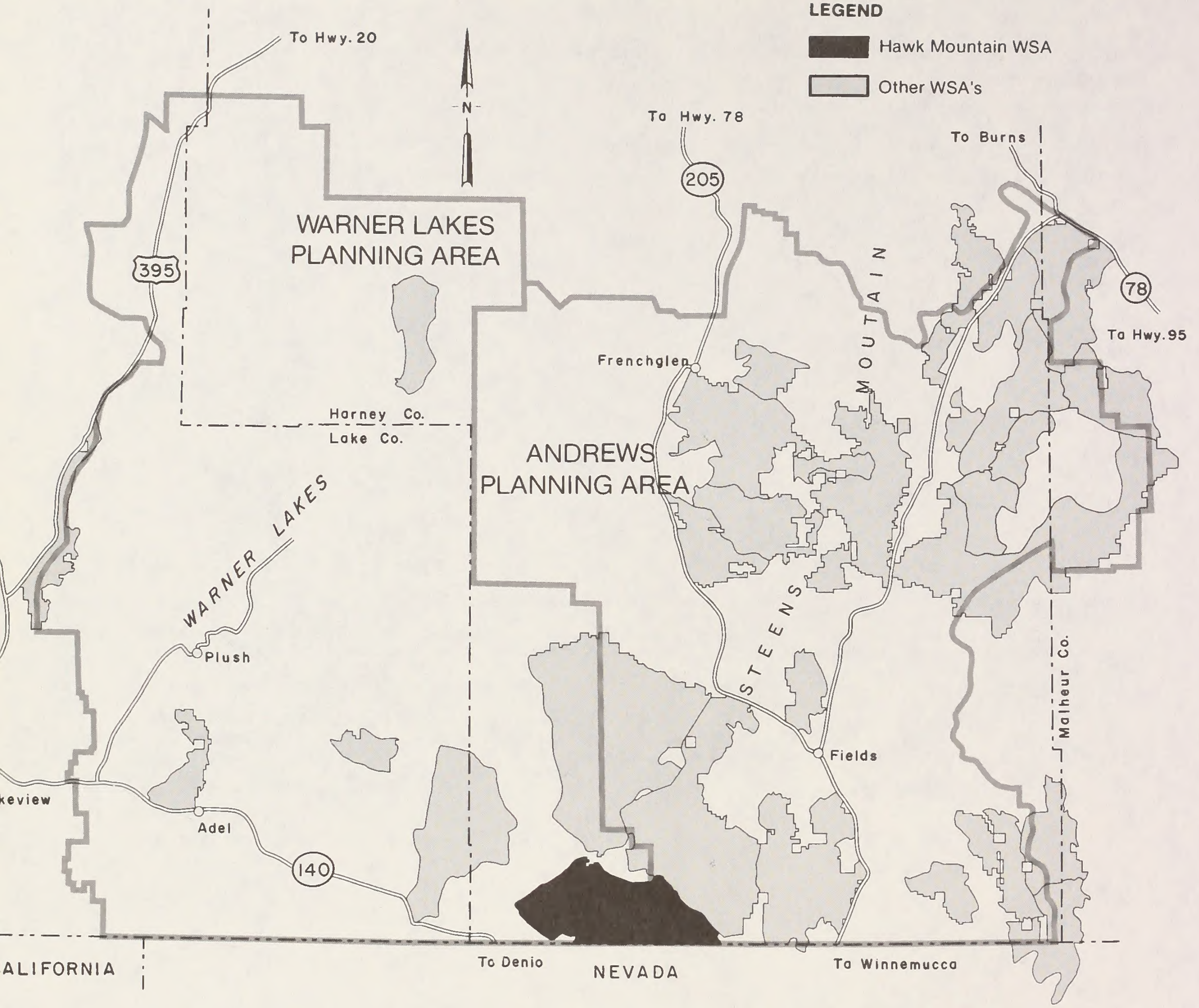
[2] Expected future increases due to range improvement investments.

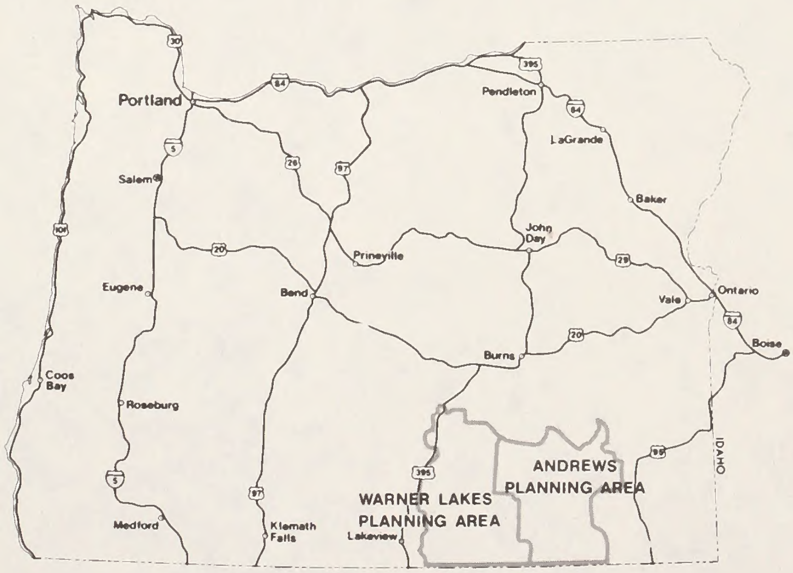
[3] A vegetative manipulation project involving up to $30,368 total expenditures, and structural projects involving up to $89,720. Amounts shown in the table represent combined results of both types of projects, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

[4] Local personal income generated annually during assumed 5-year construction period. This amount cannot be added to the income resulting from grazing and hunting activity because it is not sustained over the analysis period.

[5] Detail may not sum to "Total" due to rounding. Total omits income from construction which is limited to 5-year period. See footnote 4.

[6] See footnote 1. If the grazing adjustment is found to be unnecessary, compensating improvements would not be developed. Investments and grazing adjustments would be zero. The effects of this case are shown in parentheses.





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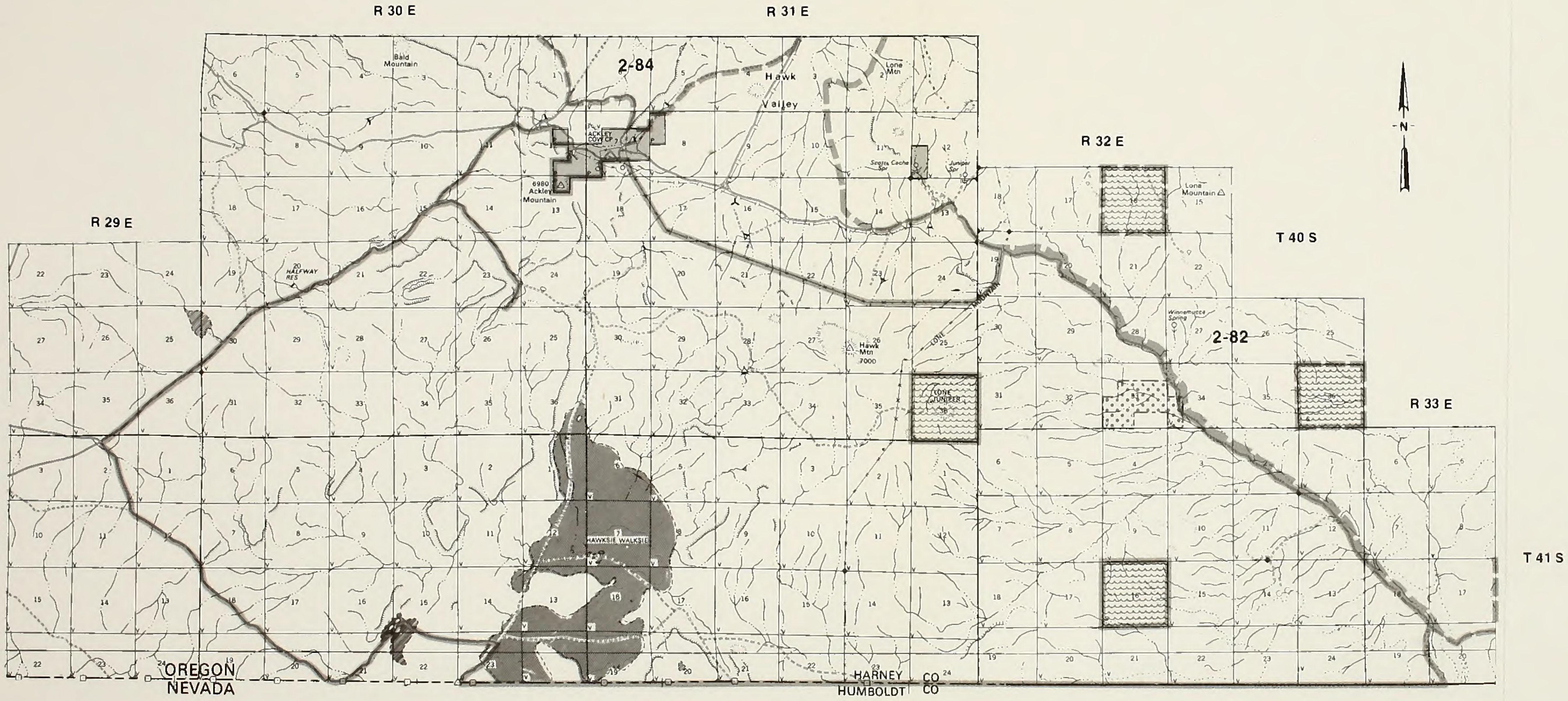
Hawk Mountain WSA
OR-1-146

LOCATION MAP

10 0 10 MILES

MAP 1



LEGEND

- Wilderness Study Area Boundary
- Boundary of Adjacent Wilderness Study Areas
- ☐ Bureau of Land Management
- ▩ Private
- ▤ BLM Surface-State or Private Subsurface (Split Estate)
- ⛆ Long Draw Research Natural Area

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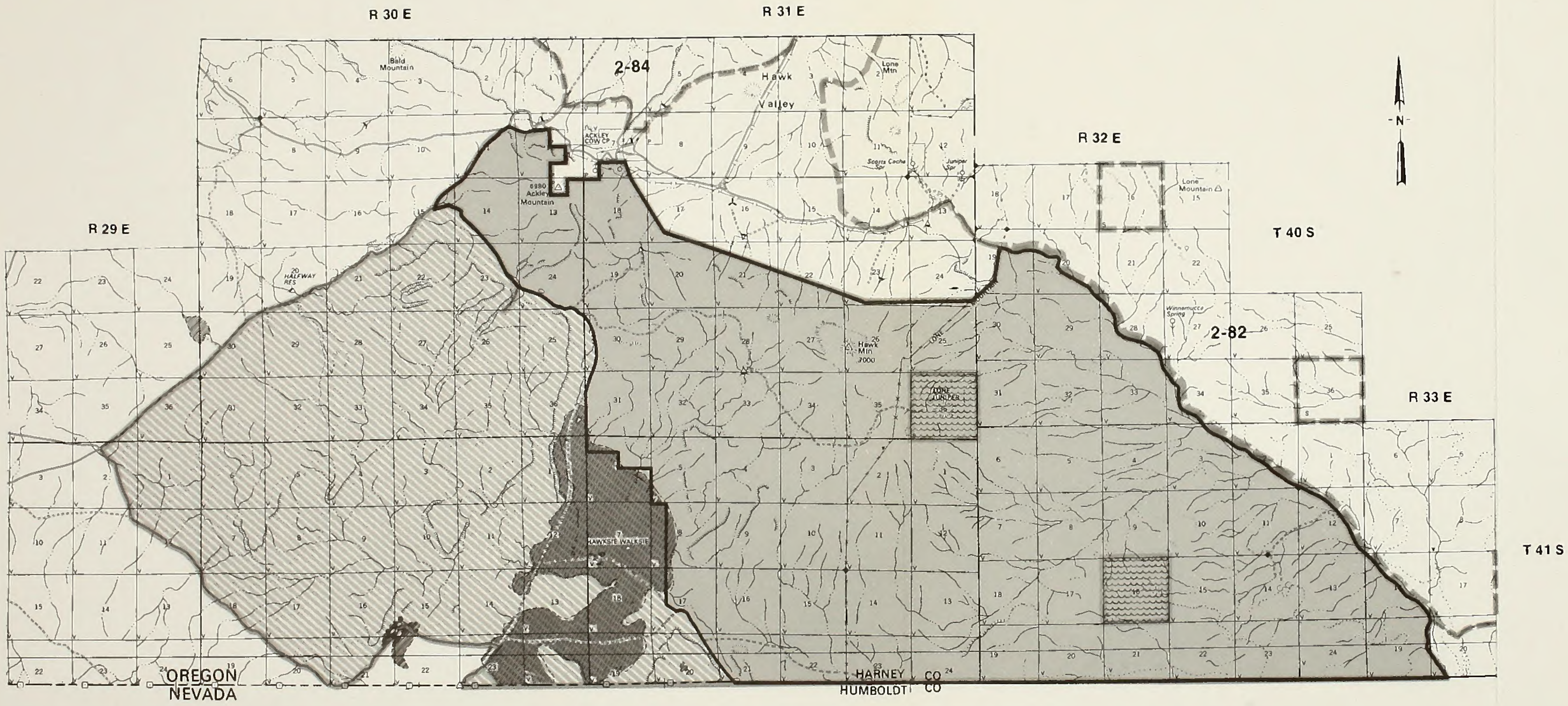
LAND OWNERSHIP

1 0 1 2 MILES

MAP 2



LEGEND

- Wilderness Study Area Boundary
- Boundary of Adjacent Wilderness Study Areas
- ▩ Recommended Suitable for Wilderness
- ▨ Recommended Non-suitable for Wilderness
- ▦ Non-Federal Minerals (Split Estate) within Area Recommended for Wilderness

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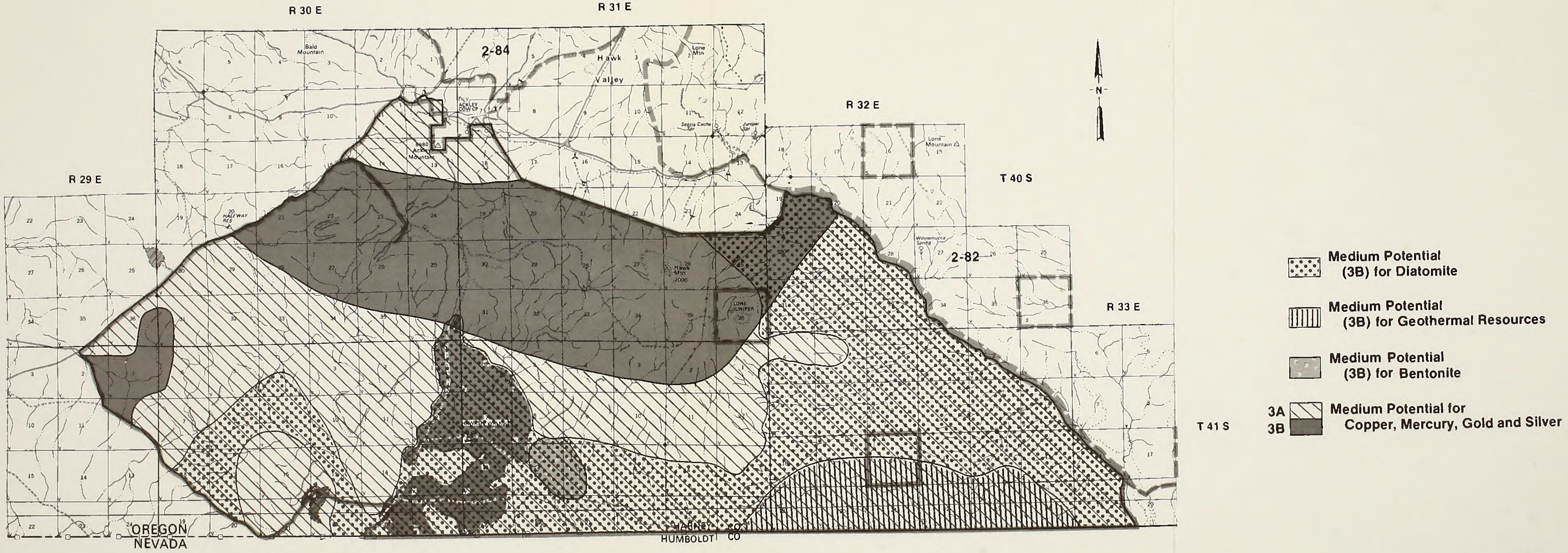
OR-1-146

PARTIAL ALTERNATIVE

1 0 1 2 MILES

MAP 3



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Hawk Mountain
OR-1-146

MEDIUM OR HIGH POTENTIAL MINERAL OR ENERGY RESOURCES

MAP 4

Hawk Mountain WSA, OR-1-146. Near Rastus Waterhole in the north end of the WSA in the vicinity of Hawk Mountain. Within the area recommended suitable under the preferred (all wilderness) and partial alternatives. This area contains some of the more complex grassland communities within the WSA. June 1984.

Hawk Mountain WSA, OR-1-146. Acty Mountain area. Within area recommended suitable under the partial and preferred (all wilderness) alternatives. Shows terrain typical of this area and late snow on the north-facing slopes. June 1984.

Appendix to the Wilderness Environmental Impact Statement for Oregon

Thirtymile (OR-5-1) and Lower John Day (OR-5-6) Wilderness Study Areas

General Description of Study Area

The Thirtymile wilderness study area (WSA) is located along 8.5 miles of the John Day River about 20 miles northwest of Fossil, Oregon, about 110 miles southeast of Portland, Oregon, and about 40 miles southeast of The Dalles, Oregon (see map 1). The Lower John Day WSA borders the Thirtymile WSA on the south and extends along approximately 29 river miles of the John Day River. The river forms the boundary between Sherman and Gilliam Counties within both WSAs.

Both WSAs straddle the John Day River and are basically oblong in shape, lying in a northwest-southeast direction (see map 2). Width of the Thirtymile WSA ranges from 2 to 5 miles east to west, and it is 5 miles long. The Lower John Day WSA is approximately the same width but is almost 8 miles long. An error in the original acreage calculations for both the Thirtymile and Lower John Day WSAs was discovered after the wilderness inventory was completed.

There are 7,538 acres of public land within the Thirtymile WSA. A 40-acre parcel of private land is located at the end of a dead-end road. The parcel is not inside the WSA because the WSA boundary extends along the dead-end road; but the parcel is surrounded by BLM land. One tract of 22 acres has been deleted from the WSA because a road (not previously identified) separates this area from the remainder of the WSA.

There are 19,352 acres of public land within the Lower John Day WSA and 160 acres of private inholdings. In addition, 160 acres of private land are located at the end of a dead-end road. The parcel is not inside the WSA because the WSA boundaries extend along the dead-end road; but the parcel is surrounded by BLM land. One tract of 18 acres has been deleted from the WSA because a road (not previously identified) separates this area from the remainder of the WSA.

Two other parcels of private land totaling 320 acres and two dead-end roads totaling 2.6 miles separate the two WSAs. These two parcels of private land form a portion of the northern boundary of the Thirtymile WSA and the southern boundary of the Lower John Day WSA. Private lands surround most of both WSAs, and private land and a road separate them.

The east and west boundaries of both WSAs are formed by several primitive roads and adjacent private and public lands. Private, public and state lands border the Lower John Day WSA on the north. The southern boundary of the Thirtymile WSA is formed by a legal section line (used to divide this WSA from other BLM public land determined not to possess wilderness values.)

A dead-end road 1.6 miles long enters the Lower John Day WSA forming part of the boundary.

The only legal public access to both WSAs is by floating the John Day River. A put-in point is located at Clarno where State Highway 218 crosses the John Day River and a take-out point is at Cottonwood Bridge where State Highway 206 crosses the river. Water quality of the John Day River meets state quality standards.

The Thirtymile and Lower John Day WSAs both contain several springs. The Lower John Day WSA also contains 4 perennial tributaries of the John Day River. Vegetation in both WSAs is a big sagebrush bunchgrass community. Juniper trees are scattered throughout the area. Side canyons with springs have small riparian zones containing thickets of chokecherry, red osier dogwood, mockorange, poison ivy, and water birch.

Interrelationships

A 147-mile stretch of the John Day River, including the segment passing through the WSAs, is an Oregon State Scenic Waterway, which provides some state control over private land use changes within a 1/2-mile-wide river corridor. In addition, the National Park Service has recommended this section of the river as a national wild and scenic river. No action has been taken on this recommendation.

A 1/2-mile-wide corridor (1/4-mile on each side of the John Day River), extending from Thirtymile Creek downstream to the confluence of the John Day River with the Columbia River, has been designated by Oregon State law as the John Day River Wildlife Refuge. No hunting is allowed within this area. This affects some 2,720 acres in the Thirtymile WSA and 9,280 acres in the Lower John Day WSA.

Portions of both WSAs near the John Day River are part of power site reserves which earmark the land for potential water power and water storage development. These "withdrawals" are scheduled for review in the next few years, which may lead to their revocation. Power site development is not foreseen and therefore is not discussed further. (See the Statewide EIS Volume.)

Both WSAs are entirely within lands ceded to the U.S. Government by the Warm Springs Indian Tribe by ratified treaty. This treaty reserved to the Indians rights for hunting, fishing and gathering in usual and accustomed places and grazing stock on unclaimed land.

Issues

Issues relating to each WSA were raised by BLM and the public during the wilderness inventory and EIS planning and scoping process. These issues concern both the effects of wilderness designation on existing and potential land uses or resources in the WSAs, as well as the effects of existing and potential land uses or resources on wilderness values. Land uses or resources raised as issues specifically for these WSAs include:

- existing vehicle use for livestock management,

- existing oil and gas leases and future exploration and development (particularly in areas not covered by stipulations which protect scenic qualities), and

- river nesting and habitat areas for migrating birds (particularly, potential for adverse effects due to increases in recreation use from wilderness designation).

Also identified as an issue was the intensive fire management and visitor control programs (including search and rescue) that might be needed as well as the potential for increased trespass and vandalism on private lands due to increased visitor use under wilderness designation. (The potential for increased trespass litter and vandalism on private lands due to wilderness designation and control of these undesirable activities is a major concern to local landowners.) This issue is not addressed because substantial visitor use increases are not expected to result from designation.

Description of the Alternatives

The following alternatives are analyzed:

- all wilderness
- preferred alternative
- partial
- no wilderness/no action

An opportunity exists to close the road separating Thirtymile and Lower John Day WSAs and manage them as a single unit if they both were designated wilderness. This is analyzed under the preferred alternative.

An enhanced alternative is not analyzed because no other feasible opportunity exists to substantially enhance wilderness values beyond those analyzed in the all wilderness or preferred alternatives.

Another alternative considered but not analyzed is the possibility of recommending the 1,750 acres of public land between the North Pole Ridge WSA (OR-5-8) and the Thirtymile WSA suitable as wilderness and combining the two areas into one larger area. This alternative was not considered feasible because of the existing 36-inch, buried gas pipeline and adjacent constructed maintenance road. Use and maintenance of this road will continue and possibly increase with construction of an additional pipeline through this area in the near future.

All Wilderness

Under the all wilderness alternative, all 7,538 acres and all 19,352 acres of public land in the Thirtymile WSA and Lower John Day WSA, respectively, would be recommended suitable as wilderness (see map 2). They would be managed as separate wilderness areas. For purposes of analysis, it is assumed the 40 acres of private land in the Thirtymile WSA and 320 acres of private land in the Lower John Day WSA would not be acquired. The dead-end road entering the Lower John Day WSA would remain open to vehicles.

Preferred Alternative

Under the preferred alternative, a portion of the Lower John Day WSA (15,470 acres) would be combined with a portion of the Thirtymile WSA (7,332 acres) to form a single wilderness area totaling 22,802 acres of public land (see map 3). In addition, an attempt would be made to acquire 320 acres of private land in the Lower John Day WSA and 320 acres of private land between the two WSAs. These parcels could be acquired through purchase or exchange with willing landowners. Including these acquisitions, total area recommended suitable under this alternative would be 23,442 acres.

The boundaries of this larger area would exclude those portions of the study areas that would be difficult to manage as wilderness or that possess few wilderness values. A total of 4,088 acres of public land would be recommended nonsuitable as wilderness under this alternative.

One tract of public land totaling 206 acres in the southern portion of the Thirtymile WSA would be recommended as nonsuitable for wilderness due to a 40-acre private inholding and an 80-acre finger of private land protruding into the WSA. Wilderness qualities in this area are limited because the private lands would create a narrow travel corridor on the public lands. Movement through the area would be restricted, and opportunities for solitude and primitive and unconfined types of recreation would be limited.

In the Lower John Day WSA, 3,882 acres would be recommended as nonsuitable for wilderness. Exclusion of 345 acres in the southeast portion along Buckskin Canyon would eliminate an isolated finger of public land having a narrow shape and containing a road which reduces naturalness and opportunities for solitude. An area of 1,411 acres in the upper end of Jackknife Canyon would be recommended as nonsuitable for wilderness because it would be difficult to manage as wilderness. The only logical access route to this tract is along the bottom of Jackknife Canyon and across private land.

The remaining 2,126 acres which would be recommended as nonsuitable in the Lower John Day WSA, consists of three "fingers" of public land in the northern part of the WSA. These tracts are almost surrounded by private land, which would limit opportunities for solitude or primitive recreation. These tracts contain little river frontage and limited wilderness values.

Under this alternative, 4.2 miles of dead-end road would be closed, including the 2.6 miles of boundary road between the two WSAs, if attempts to acquire the two private inholdings were successful. Both WSAs would be manageable as wilderness whether or not the inholdings were acquired.

Partial

Under the partial alternative, 5,686 acres of public land in the Thirtymile WSA and 12,767 acres of public land in the Lower John Day WSA would be recommended suitable as wilderness and managed as separate wilderness areas (see map 4). There would not be any private inholdings within the area recommended suitable for Thirtymile WSA, but 320 acres of private inholdings would remain in the Lower John Day WSA. The dead-end road in the

Lower John Day WSA would remain open to vehicle use.

The 1,852-acre area recommended nonsuitable in the Thirtymile WSA, and the 6,585-acre nonsuitable area in the Lower John Day WSA both lie outside the area seen from river level. Most of these lands are beyond the rims of the John Day River Canyon. Within the Thirtymile WSA, portions of Chisholm, Cordwood, Buckskin and Potlatch Canyons are recommended nonsuitable as wilderness under this alternative.

Within the Lower John Day WSA, portions of the John Day River, Jackknife, Rutledge, Marlin, Nat Wheat, Little Ferry, Willowspring, Buckskin, Long Hollow, Shellrock, Pearson, Grass, and Rose Briar Canyons, and two smaller unnamed canyons are recommended nonsuitable as wilderness.

Under this alternative, the areas recommended nonsuitable would be managed in a way not necessarily compatible with wilderness. This would include the use of motorized vehicles by local landowners and their guests. Oil and gas exploration and development and exploration for and mining of gold and zinc, both of which have a moderate potential in the Thirtymile and Lower John Day WSAs, could occur in the nonsuitable portions of the WSA outside of the main John Day River Canyon.

No Wilderness/No Action

The no wilderness/no action alternative would recommend both WSAs nonsuitable as wilderness. It represents the situation most likely to occur without wilderness designation. The area would be managed according to the current land use plan, which includes the following features relevant to this analysis:

- continued use of motorized vehicles in accessible portions of both WSAs, and

- continued availability for mineral exploration and development.

Table 1 summarizes the proposed management of the WSA under each alternative.

Table 2 summarizes the environmental consequences of each alternative.

Table 1. Summary of Proposed Management Under Each Alternative, Thirtymile (OR-5-1) and Lower John Day (OR-5-6) WSAs

Proposed Management	All Wilderness	Preferred	Partial	No Wilderness/ No Action
Acres Designated as Wilderness	26,890	22,802	18,453	0
Acres Closed to ORVs by Wilderness Designation	26,890	22,802	18,453	0
Miles of Roads Closed	0	4.2	0	0
Miles of Ways Closed	9.8	9.8	3.0	0
Acres of Full Fee Estate Acquired[1]	0	640	0	0
Acres Withdrawn from Mineral Location and Leasing by Wilderness Designation	26,890	22,802	18,453	0
Structural Wildlife Projects Developed: (number)				
Fences (miles)	0-2.2	0-2.2	0-2.2	2.2
Nest Structures	0-65	0-65	0-65	65

[1] Upon acquisition, these additional lands would be incorporated into the wilderness area, closed to vehicle use, and withdrawn from mineral location and leasing.

Manageability of the Area as Wilderness

Both of the WSAs would be manageable as wilderness under the all wilderness, preferred and partial alternatives. However, the areas could be more difficult to manage in the all wilderness alternative because the wilderness areas would include narrow extensions bounded by private lands, and because of the possibility that private inholdings could be developed or used in ways that would not be compatible with wilderness management of the public lands. The area recommended suitable under the preferred alternative would be more manageable as wilderness because the inholdings would be acquired, if the owners were willing to sell or exchange their lands, and because the narrow extensions of the WSAs would be recommended nonsuitable as wilderness.

The two private inholdings in the Lower John Day WSA and two private parcels between the two WSAs are located on the river. These lands are presently used for livestock grazing, fishing, or camping; however, this could change at the discretion of the landowner. There has been no indication that present use of the land would change in the forseeable future.

Table 2. Summary of Environmental Consequences of Alternatives, Thirtymile (OR-5-1) and Lower John Day (OR-5-6) WSAs

Resource or Activity	All Wilderness	Preferred	Partial	No Wilderness/ No Action
Wilderness Values	Would add 7,538 acres in the Thirtymile WSA and 19,352 acres in the Lower John Day WSA to the NWPS. WSAs would be managed as separate wilderness areas. Closure of 2.5 miles of ways within the Thirtymile WSA and 7.3 miles of ways within the Lower John Day WSA would enhance naturalness and improve opportunities for solitude and primitive recreation. Developments on private inholdings could impair wilderness values on surrounding public lands. Both WSAs would be manageable as wilderness.	Would combine portions of the Thirtymile and Lower John Day WSAs into one wilderness area and add 23,442 acres to the National Wilderness Preservation System assuming acquisition of private land. Closure of 4.2 miles of road, including the road between the two WSAs, and 9.8 miles of ways would enhance naturalness and improve opportunities for solitude and primitive recreation. The area recommended suitable within both WSAs would be manageable as wilderness. In the areas recommended nonsuitable, wilderness values could be impaired by oil and gas exploration and development in portions out of view from the river and by mining for metallic minerals and other activities in any portion of the area recommended as nonsuitable.	Would add 5,686 acres in the Thirtymile WSA and 12,767 acres in the Lower John Day WSA to the NWPS, as two separate wilderness areas. Closure of 0.6 miles of ways within the Thirtymile WSA and 2.4 miles of ways within the Lower John Day WSA would enhance naturalness and improve opportunities for solitude and primitive recreation. Wilderness characteristics in portions recommended as nonsuitable could be adversely affected by surface disturbing activities on lands outside the area viewed from the river. The areas recommended suitable within both WSAs would be manageable as wilderness.	Wilderness characteristics of both WSAs could be adversely affected by future mining and hydroelectric projects. In addition, if oil and gas development occurred, wilderness qualities within both WSAs could also be adversely affected in the area not protected from surface disturbance in oil and gas lease stipulations, which totals 1,852 acres in the Thirtymile WSA and 6,585 acres in the Lower John Day WSA.
Energy and Mineral Development	Development precluded on 7,538 acres in Thirtymile WSA and 19,352 acres in Lower John Day WSA, including area with moderate potential for oil and gas (all of both WSAs), metals, and uranium/thorium (all or part of Thirtymile). 5,686 acres in Thirtymile WSA and 12,767 acres in Lower John Day WSA are included in a no-surface-occupancy leasing stipulation.	Development precluded on 22,802 acres in Thirtymile and Lower John Day WSAs combined, plus an additional 640 acres if private land is acquired. Includes area with moderate potential for oil and gas (all of both WSAs), metals, and uranium/thorium (all or part of Thirtymile). 5,686 acres in Thirtymile WSA and 12,767 acres in Lower John WSA are included in a no-surface-occupancy leasing stipulation.	Development precluded on 5,686 acres in Thirtymile WSA and 12,767 acres in Lower John Day WSA, including area with moderate potential for oil and gas (all of both WSAs), metals, and uranium/thorium (all or part of Thirtymile). All of this area is included in a no-surface-occupancy leasing stipulation.	No Impact. 5,685 acres in Thirtymile WSA and 12,767 acres in Lower John Day WSA remain under no-surface-occupancy leasing stipulation.
Wildlife	Wildlife habitat preserved. Wildlife projects, which would protect riparian areas and increase goose populations may be foregone.	Wildlife habitat preserved in suitable area. Effects on projects same as all wilderness.	Same as preferred.	Wildlife projects protecting riparian areas and increasing goose populations would be constructed.
Livestock Grazing	Possible restrictions on vehicular use for grazing management. No significant impact.	Same as all wilderness.	Same as all wilderness.	No impact.
Recreation Use	Recreation use would increase slightly after designation, in addition to normal increases. Limitations on use levels would be implemented if wilderness values were threatened by crowding. Vehicle-oriented recreation use would be displaced.	Same as all wilderness.	Same as all wilderness, except vehicle-oriented recreation use on ridgetops would continue.	Normal increase would continue. Recreation use would be highest under this alternative. Restrictions on use could be implemented if campsites deteriorate.

Table 2.

Resource or Activity	All Wilderness	Preferred	Partial	No Wilderness/ No Action
Economic Value and Local Income	Changes in annual economic value could be a decrease of as much as $27,263 or an increase of as much as $2,149, depending on what proposed projects would be allowed in wilderness. Local personal income would decrease by $8,099 to $4,020 depending on the same uncertain factors. Both sets of figures include loss of oil and gas leases and exclude unknown economic effects of mineral development and unquantified changes in recreation use. The maximum increase in transportation costs to livestock operators would be $373.	Changes in annual economic value could be a decrease of as much as $23,175 or an increase of as much as $6,236, depending on what proposed projects would be allowed in wilderness. Local personal income would decrease by $6,867 to $2,788 depending on the same uncertain factors. Both sets of figures include loss of oil and gas leases and exclude unknown economic effects of mineral development and unquantified changes in recreation use. The maximum increase in transportation costs to livestock operators would be $373.	Changes in annual economic value could be a decrease of as much as $18,826 or an increase of as much as $10,586, depending on what proposed projects would be allowed in wilderness. Local personal income would decrease by $5,542 to $1,463 depending on the same uncertain factors. Both sets of figures include loss of oil and gas leases and exclude unknown economic effects of mineral development and unquantified changes in recreation use. The maximum increase in transportation cost to livestock operators would be $373.	Increase in annual economic value by $29,412 and increase in local personal income by $4,079 from construction of proposed projects.

Rationale for Selection of the Preferred Alternative

Designating a total of 22,802 acres in the WSAs as wilderness and combining them into a single wilderness is the preferred alternative because preserving the wilderness values on those lands would outweigh the benefits of allowing the lands to remain open for such activities as oil and gas exploration and development, mining for metallic minerals, or construction of hydroelectric projects. Combining the Thirtymile WSA with the Lower John Day WSA would preserve wilderness values which are unique in the region.

Special wilderness features which would be preserved include a high density of prehistoric and historic sites, anadromous fish populations and unique vegetative communities. The area designated wilderness would include the John Day River, most side canyons, cultural resource sites and nearly all areas that contain outstanding wilderness values.

The rare opportunity to float or hike 37.5 miles through a major river canyon up to 1,600 deep in a nearly natural condition would be preserved. This canyon area is characterized by steep, red and tan, rocky bluffs and numerous side canyons that offer outstanding opportunities for solitude and a wide range of primitive and unconfined types of recreation.

A total of 4,088 acres in the two areas would be recommended as nonsuitable for wilderness in the preferred alternative because they have few wilderness values and the benefits of preserving the limited wilderness values on those lands would be outweighed by the benefits of retaining options for development of minerals and other resources.

Affected Environment

This section discusses only those activities or resources that influence the character of the study areas, or that may be affected by the alternatives.

Wilderness Values

Naturalness

Almost all portions of the Thirtymile and Lower John Day WSAs remain in a nearly natural condition and are affected primarily by the forces of nature. A few minor signs of human activity are dispersed throughout both WSAs. Man-made features within the Thirtymile WSA include 1.9 miles of fence, one spring development, an old wooden cabin with a deteriorating corral and 2.5 miles of ways (vehicle routes established and maintained solely by the passage of vehicles). Man-made features in the Lower John Day WSA include 11.8 miles of fence, 4 spring developments, and 7.3 miles of ways. These developments in both areas are predominantly on the ridgetops and their presence does not generally dominate the landscape.

Approximately 17 percent of the combined acreage of both WSAs are influenced by man-made features. (The area of influence is an estimate of the acreage within the WSA from which these features can be seen.) However, the cumulative effect of these man-made features is not significant due to the type of development, the size and shape of the WSAs, outstanding topographic screening and the dispersal of the developments throughout both WSAs. The meanderings of the John Day River contain many bends and few straight stretches of river, so float-boaters or hikers encounter very few developments along this river at any one time.

Outside sights and sounds that adversely affect solitude in both study areas include the sounds of the Kent natural gas booster station 4 miles west of the Thirtymile WSA, periodic low elevation flights in the canyon by military jets, occasional plane landings on a primitive private airstrip north of Horseshoe Bend and vehicle travel into two parcels of private land between the two WSAs. However, these sights and sounds are either temporary or not significant enough to appreciably affect the naturalness of the canyon.

Opportunities for Solitude or Primitive and Unconfined Types of Recreation

Outstanding opportunities for solitude exist in most portions of both WSAs, particularly within the main canyon of the John Day River. There are also outstanding opportunities for solitude in most isolated side canyons within the boundaries of both WSAs. A unique type of solitude can be experienced by floating or hiking within this study area. The reddish brown Columbia River basalt canyons range in depth from 800 to 1,600 feet and totally engulf the visitor, giving one a complete feeling of being alone. Secluded spots outside of the main canyon in the Thirtymile WSA are located in portions of Chisholm, Cordwood, Beef Hollow, Potlatch and two other unnamed canyons.

The Lower John Day WSA contains numerous secluded spots within its 23 side canyons, which total over 40 miles. Most of these isolated side canyons are rocky, relatively long, and steep.

Outstanding opportunities for primitive recreation in both WSAs include whitewater boating on the John Day River by raft, drift boat, canoe or kayak during the late spring and early summer months (a period of 3 to 4 months depending on river levels.) This opportunity is outstanding because of:

- a variety of fast to slow moving water, intermixed with a few moderately challenging rapids within the WSAs;
- outstanding scenic quality of the John Day River canyon;
- opportunities to fish, camp and view wildlife and historic, geologic and archeological sites;
- opportunity to see an area that is predominantly unimpaired in its natural beauty and character; and
- the length of the river trip, 2 to 4 days, or longer if desired, from Clarno to Cottonwood Bridge. While one can float through the study areas in a day or two, limitations on access to the river make a longer trip necessary.

Fishing opportunities for smallmouth bass, squawfish, bullhead, channel catfish, carp, chinook salmon and steelhead are available along the river within the WSAs. Outstanding day hiking opportunities exist in all 6 side canyons of the John Day River within the Thirtymile WSA and in 15 of the 23 side canyons within the Lower John Day WSA.

Opportunities for sightseeing and photography are also outstanding in both WSAs. Thirtymile WSA offers opportunities for backpacking, camping, wildlife observation and hunting, but they are less than outstanding. Except for backpacking, these activities are also less than outstanding in the Lower John Day WSA.

Special Features

The Thirtymile and Lower John Day WSAs contain the following special wilderness features:

Both WSAs lie within the largest continental basalt flow formation in the world (Columbia River Basalt Formation.) The John Day River cut a dramatic cross section through this plateau as it formed the John Day Canyon.

The Thirtymile WSA contains 8.5 miles and the

Lower John Day WSA contains 29 miles of the John Day River with scattered wet areas of lush vegetation which contrast against an otherwise dry landscape.

Two plant species that are of special interest are believed to occur in the WSAs: *Castilleja xanthotricha* and *Collomia macrocalyx*. (See the Vegetation section for more information.)

The John Day River provides aquatic habitat for steelhead trout and chinook salmon (some of Oregon's last remaining native salmonid runs.)

Both WSAs contain prehistoric and historic sites, including prehistoric pithouse sites, 2 old cabins and wagons left from the filming of an old movie in Thirtymile WSA, and house pits, rock shelters and rock art sites in the Lower John Day WSA.

Both WSAs contain vegetation representative of a climax bluebunch wheatgrass ecosystem. There are opportunities to study native range sites which could be useful for vegetative comparison and as pristine plant reserves. This could be beneficial for future genetic experiments.

Both WSAs contain outstanding scenic qualities because of the cliffs, columns and pillars in the John Day River Canyon.

Diversity in the National Wilderness Preservation System (NWPS)

According to the Bailey/Küchler system of classifying ecosystems, the Thirtymile and Lower John Day WSAs are located in the Palouse Grassland Province and contain the sagebrush steppe and wheatgrass bluegrass ecosystems. The WSAs contain the following ecosystems listed in the High Lava Plains and Columbia Basin section of the Oregon Natural Heritage Plan: big sagebrush/bluebunch wheatgrass, big sagebrush/Idaho fescue, rigid sagebrush/Sandberg's bluegrass, bluebunch wheatgrass/Sandberg's bluegrass, and Idaho fescue/bluebunch wheatgrass.

There are several standard metropolitan statistical areas with 5 hours' driving time of these WSAs: Eugene/Springfield, Portland, and Salem, Oregon; and Richland/Kennewick/Pasco, Yakima, and Tacoma/Seattle/Everett, Washington.

Energy and Mineral Development

Energy and mineral resources were evaluated from available geologic data supplemented by a limited amount of geochemical rock chip sampling by a BLM geologist. Technical details of the evaluation are found in a BLM report and file titled, 'Assessment of Geology, Energy, and Minerals (GEM) Resources, Lower John Day River Geologic Resource Area.'

Both WSAs are within the Lower John Day River geologic resource area, which has been classified according to a rating system that indicates both the potential for occurrence (geologic favorability) of certain minerals, as well as the quantity and quality of data on which the rating is based (confidence level). A description of the rating system is provided in the Statewide EIS volume.

Rock chip samples indicate some moderate potential for mercury, zinc, lithium, gold, and uranium in the Thirtymile WSA, but a lack of favorable indications for most minerals in the Lower John Day WSA. Zinc and mercury are two strategic and critical minerals which have moderate favorability for occurrence in Thirtymile WSA; but no deposits of strategic and critical minerals are known to exist in the WSA.

Oil and gas is rated with moderate potential based on several positive factors. Several oil and gas exploration wells have been drilled a few miles south of the WSA with one of the wells recovering gas. In the same area, there are three reported asphalt occurrences. Near Condon, a deep well had a slight oil show. The discovery of subcommercial gas in Washington beneath the Columbia River Basalt indicates gas was generated and preserved in areas similar to the WSAs. The combination of surface and subsurface hydrocarbon shows, surface and subsurface geology, and current oil and gas leasing all lead to a moderate potential for oil and gas in both WSAs. Both WSAs were entirely covered by oil and gas leases as of January 1, 1984.

Current management preserves the natural character of the area viewed from the John Day River from oil and gas exploration and development by use of no-surface-occupancy lease stipulations. There are 1,852 acres in Thirtymile WSA and 6,585 acres in Lower John Day WSA, which are outside the area viewed from the river and are therefore not included in a no-surface-occupancy stipulation.

Table 3 shows the mineral potential classifications for the WSA. Map 5 shows the portion of the Thirtymile WSA rated moderate for metallic minerals. There were no mining claims and no geothermal leases in either WSA as of January 1, 1984.

The exposed rocks in the WSAs are Tertiary flood-type basalt flows. The subsurface rocks are inferred from oil and gas exploration wells to include Cretaceous marine clastic sediments and pre-Cretaceous marine sediments and metamorphosed sediments.

Vegetation

Upland vegetation in the Thirtymile and Lower John Day WSAs is generally a sagebrush bunchgrass type with varying amounts of western juniper, especially in the draws. Other plants include bitterbrush, snakeweed, rabbitbrush, mockorange, cheatgrass, lupine, paintbrush, needlegrass and other grasses and forbs. Riparian vegetation includes blackberry, mockorange, red osier dogwood, willow, and wild rose as the dominant tree/shrub species.

Table 3. Classification of Energy and Mineral Potential, Thirtymile (OR-5-1) and Lower John Day (OR-5-6) WSAs

Commodity	Area	Classification Level	Confidence Level
Metals	All of Lower John Day	2	C
Metals (zinc, mercury,	Part of Thirtymile (See map 5)	3	C
lithium, gold)	Rest of Thirtymile	2	C
Diatomite	All of both WSAs	1	B
Limestone	All of both WSAs	1	B
Zeolites	All of both WSAs	1	B
Bentonite	All of both WSAs	1	B
Uranium/Thorium	All of Thirtymile	3	B
Uranium/Thorium	All of Lower John Day	1	A
Geothermal	All of both WSAs	1	C
Oil/Gas	All of both WSAs	3	C
Sodium/Potassium	All of both WSAs	1	B
Coal	All of both WSAs	1	B
Tar Sands/Oil Shale	All of both WSAs	1	B
Sand/Gravel	All of both WSAs	1	C
Crushable Rock	All of both WSAs	2	C

Legend:
Class 1 - Lack of indications of favorability
Class 2 - Low favorability
Class 3 - Moderate favorability
Class 4 - High favorability

Confidence Level A - Insufficient data or no direct evidence
Confidence Level B - Indirect evidence available
Confidence Level C - Direct evidence but quantitatively minimal
Confidence Level D - Abundant direct and indirect evidence

The potential climax vegetation is bluebunch wheatgrass with some big sagebrush. The vegetation is generally early seral in the drainages, along the John Day River, and in areas of gentle topography due to livestock grazing. (Seral refers to a stage of ecological condition based on the difference between the present plant community and climax vegetation, the relatively stable, final stage in plant succession.) Species present include cheatgrass and other weedy annuals, snakeweed, and sagebrush.

As either slope or distance from water increases, the vegetation tends toward climax. Many steep slopes and ridges far from water are nearly all bluebunch wheatgrass, with Idaho fescue on some of the north slopes. These sites have potential as "comparison areas," which could be preserved as examples of the once dominant, climax vegetation of this ecosystem. There is often a gradual gradation of ecological stages between the early-seral stage, livestock-accessible areas, and the climax areas that are inaccessible to livestock.

Two plant species of special interest (mentioned in the Special Features section) are suspected to occur in the WSAs: *Castilleja xanthotricha* (yellow hairy Indian paintbrush) and *Collomia macrocalyx* (bristle-flowered collomia). Both plants are candidates for federal listing as threatened or endangered. Both are believed to occur in the Thirtymile WSA. Only the collomia is suspected of occurring in the Lower John Day WSA. There are presently no threats to either of these species.

Wildlife

Game animals in the study areas include mule deer, chukar and Hungarian partridge, California quail and waterfowl. Furbearers plus several species of small mammals, reptiles, amphibians and nongame birds also inhabit the study area. Game fish in the John Day River include steelhead trout, spring chinook salmon, and smallmouth bass. Brown bullhead, northern squawfish, suckers, and several other nongame species are also present.

River riparian habitat within the Thirtymile WSA totals 91 acres on 8.5 miles of river, and 142 acres on 29 miles within the Lower John Day WSA. Present habitat condition is poor. Tributaries to the John Day River within the Lower John Day WSA that have some perennial waters supporting an aquatic and riparian habitat include Jackknife Canyon (5.1 miles, one mile perennial water) and Little Ferry Canyon (2.6 miles, 1.2 miles perennial water). Jackknife Canyon supports spawning and rearing habitat for steelhead and rainbow trout with Little Ferry Canyon capable of supporting game fish. Stream riparian habitat totals approximately 6 acres in fair to good condition in Jackknife Canyon and approximately 3 acres in poor to fair condition in Little Ferry Canyon.

In Thirtymile WSA, 15 waterfowl nest structures are proposed to be constructed in the tops of juniper trees, or as platforms on posts, adjacent to the river to improve nesting availability. Fifty similar nest structures are proposed in the Lower John Day WSA. Production for Canada geese would increase by 200 percent in both WSAs. Two and two tenths miles of riparian fencing (1 mile in Jackknife Canyon, 1.2 miles in Little Ferry Canyon) are proposed in the Lower John Day WSA to improve anadromous fish habitat.

Historically, California bighorn sheep inhabited the John Day River Canyon area and are currently being considered for reintroduction. The one known federally listed threatened or endangered species in the area is the northern bald eagle, an occasional winter resident, which is listed as threatened in Oregon. One golden eagle nest and five prairie falcon nests are in the Thirtymile WSA, and seven golden eagle nests and eight prairie falcon nests are in the Lower John Day WSA.

A problem for waterfowl exists during brood/rearing with boaters "pushing" juvenile ducks and geese downstream, separating them from the rest of the family group. This separation can increase mortality through increased susceptibility to predation, but there is no data available to indicate if this situation actually reduces waterfowl survival. This problem is primarily over by June 15 for geese and July 15th for ducks when juveniles mature to the point of being able to better deal with this disturbance.

Livestock Grazing

Portions of 4 grazing allotments lie within the Thirtymile WSA, and portions of 12 allotments are in the Lower John Day WSA. Table 4 summarizes existing livestock use for both WSAs in AUMs (animal unit months, the amount of forage needed to sustain one cow and a calf, or equivalent animals, for one month).

Existing development for both WSAs (among the man-made features listed in the Naturalness section) are 11.8 miles of fence and 4 spring developments. No new developments are proposed.

Table 4. Existing Livestock Use, Thirtymile (OR-5-1) and Lower John Day (OR-5-6) WSAs

Grazing Allotment	Licensed AUMs in Allot.	Period of Use	Current Percent of Allot. in WSA	Actual Use in WSA (AUMs)
		Thirtymile WSA		
Decker (No. 2538)	206	4/16-10/14	79	162
Horseshoe Bend (No. 2521)	43	7/01-09/01	58	25
Sid Seale (No. 2619)	708	3/01-02/28	26	183
Tatum (No. 2629)	133	5/16-10/19	32	36
Total Thirtymile	1,070			406
		Lower John Day WSA		
Murtha (No. 2597)	227	3/01-01/24	16	36
Higley (No. 2553)	20	4/01-08/31	95	19
Miller (No. 2591)	46	5/01-10/31	100	46
Seale (No. 2619)	708	3/01-02/28	55	391
Belshe (No. 2509)	62	4/01-06/14	100	62
Dipping Vat (No. 2631)	25	4/01-10/07	84	21
Laffon & Carlson (No. 2572)	85	6/01-10/31	95	81
Eakin (No. 2541)	12	4/01-06/30	100	12
James Brown (No. 2522)	65	5/01-10/31	100	65
Martin (No. 2581)	22	5/01-10/15	64	14
Horseshoe Bend (No. 2521)	43	7/01-09/01	42	18
Decker (No. 2538)	206	4/16-10/14	18	38
Total Lower John Day	1,521			803
		Total both WSAs		1,109

The 2.5 miles of ways in the Thirtymile WSA and 1.6 miles of dead-end road and 7.3 miles of ways in the Lower John Day WSA are used primarily for livestock supervision, and inspection and repair of existing livestock developments. Livestock management requires use of horses almost daily due to the lack of vehicular access. Livestock operators make from 10-15 trips per year by vehicles into each WSA for livestock management.

Cultural Resources

Information about cultural resources in the WSAs was collected from field surveys in the John Day River Canyon in 1976. Human occupancy of this region dates back between 4,500 and 7,000 years. Historically, the Tenino, a Columbia River culture, occupied the lower John Day River Canyon, among other areas. There have been 2 prehistoric sites (pithouse sites) and 3 historic sites identified within the Thirtymile WSA. Historic sites include old cabins and wagons left from the set of an early movie filmed in the area.

Vandalism has left few of these sites undisturbed. Illegal excavation of archaeological sites by artifact collectors is presently the greatest threat to the integrity of the area.

Recreation Use

The Thirtymile and Lower John Day WSAs encompass some of the most interesting and scenic portions of the John Day River Canyon. The John Day River, a designated State Scenic Waterway, is becoming more popular each year with floating recreationists.

Recreational activities such as big game, upland game and waterfowl hunting, which require vehicular access by land rather than boat, are limited in the WSA due to the lack of public access. Vehicle access across private land into the WSAs is exclusively by local landowners and their guests.

Economic Value and Local Income

Livestock grazing, recreation, and oil and gas leases are resource outputs which generate economic activity in these WSAs. As of January 1, 1984, there were no geothermal leases on the WSA.

Economic value and local personal income generated from existing levels of resource outputs are presented in tables 5a-c. The terms economic value and local personal income are discussed in the Statewide EIS volume.

Table 5a. Economic Value and Local Personal Income Generated Annually, Existing Program,Thirtymile (OR-5-1) and Lower John Day (OR-5-6) WSAs Combined (1981 price levels)

Resource Output	Unit of Measure	Quantity	Economic Value	Local Personal Income Generated
Grazing	AUM	1,209	$ 9,116	$11,921
Recreation (incl. hunting)	RVD	Unknown	Unknown	Unknown
Oil & gas leases	Acres	26,890	26,890	8,098
Total			36,006	20,019

Table 5b. Economic Value and Local Personal Income Generated Annually, Existing Program,Thirtymile WSA (OR-5-1) (1981 price levels)

Resource Output	Unit of Measure	Quantity	Economic Value	Local Personal Income Generated
Grazing	AUM	406	$ 3,061	$ 4,003
Recreation (incl. hunting)	RVD	Unknown	Unknown	Unknown
Oil & gas leases	Acres	7,538	7,538	2,270
Total			10,599	6,273

Table 5c. Economic Value and Local Personal Income Generated Annually, Existing Program, Lower John Day (OR-5-6) WSAs (1981 price levels)

Resource Output	Unit of Measure	Quantity	Economic Value	Local Personal Income Generated
Grazing	AUM	803	$ 6,055	$ 7,918
Recreation (incl. hunting)	RVD	Unknown	Unknown	Unknown
Oil & gas leases	Acres	19,352	19,352	5,828
Total			25,407	13,746

Environmental Consequences

This section discusses the environmental consequences of implementing each of the alternatives. Resources and activities not significantly affected by any of the alternatives are not discussed. General impact conclusions applicable to all WSAs, including impact conclusions based on speculative future developments (developments which are possible, but are not currently proposed) are discussed in the

Statewide EIS volume. That volume also discusses certain assumptions that were made for this analysis.

Effects on Wilderness Values

The **all wilderness alternative** would add, all 7,538 acres of public land in the Thirtymile WSA and all 19,352 acres of public land in the Lower John Day WSA (totaling 26,890 acres) to the National Wilderness Preservation System (NWPS). Each WSA would be managed as a separate wilderness area. The outstanding wilderness characteristics would be preserved in and adjacent to a 37.5 mile segment of the John Day River Canyon with over 29 side canyons and portions of the plateau bordering the canyon. The opportunity of floating or hiking through a major uncrowded river canyon which is in near natural condition is uncommon in this region. In addition, the outstanding scenic quality of the area would be preserved under this alternative.

Eliminating vehicle use on 2.5 miles of ways in the Thirtymile WSA and 7.3 miles of ways in the Lower John Day WSA would enhance the naturalness of the areas and improve opportunities for solitude and primitive recreation.

If minerals or other resources were developed on the private inholdings, wilderness values on the surrounding public lands would be adversely affected. There are no indications that landowners intend to develop the inholdings in the foreseeable future.

The **preferred alternative** would combine portions of both WSAs into a single wilderness area and would add 23,442 acres to the NWPS, assuming the 640 acres of private land could be acquired (320 acres of inholdings and 320 acres located in two adjacent parcels on the boundary between the WSAs).

Vehicle use on 9.8 miles of ways and on 1.6 miles of dead-end road would be eliminated under this alternative, and if the private inholdings at Horseshoe Bend were acquired, vehicle traffic on 2.6 miles of road between the WSAs also would be eliminated. Wilderness values would be enhanced by the closure of the road between the two WSAs and the acquisition of private land. The area's naturalness would be enhanced, and opportunities for solitude and primitive recreation would be improved.

On the 4,088 acres recommended as nonsuitable for wilderness, oil and gas exploration and development on portions outside of view from the river, mining for metallic minerals, and other types of developments could impair wilderness values. These impacts would be more significant in Buckskin and Jackknife Canyons than on other lands recommended as nonsuitable because these two canyons offer more opportunities for solitude and primitive recreation.

The **partial alternative** would add 5,686 acres in the Thirtymile WSA and 12,767 acres in the Lower John Day WSA to the NWPS as two separate wilderness areas. Under this alternative, wilderness values in those portions of the canyon which could be seen from the river would be preserved.

Naturalness and opportunities for solitude and primitive recreation within portions recommended nonsuitable for wilderness could be adversely affected by land use activities not compatible with wilderness values. These activities could include mining and oil and gas exploration and development. Within the Thirtymile WSA, wilderness values could be impaired in portions of Chisholm, Potlatch, Cordwood and Buckskin Canyons. Most of these side canyons offer outstanding opportunities for solitude and primitive recreation. Within the Lower John Day WSA, these same opportunities could be impaired in portions of Jackknife, Little Ferry, Dipping Vat, Currie, Rutledge, Marlin, Nat Wheat, Long Hollow, Shell Rock and Grass Canyons, as well as four other unnamed side canyons and numerous draws and ravines.

Under the partial alternative, 0.6 mile of way in portions of the Thirtymile WSA recommended suitable for wilderness and 2.4 miles of ways in the Lower John Day WSA would be closed to vehicle use. As a result, the areas' naturalness would be enhanced and opportunities for solitude and primitive recreation would be improved.

Some 1.9 miles of vehicle ways in the portions of the Thirtymile WSA recommended as nonsuitable for wilderness and 4.9 miles of vehicle ways within the Lower John Day WSA would remain open for vehicle use by adjacent landowners and their guests. Continued vehicle use would prevent the ways from revegetating and would continue to reduce opportunities for solitude and primitive recreation.

Under the **no wilderness/no action alternative**, naturalness, opportunities for solitude and primitive recreation, and special wilderness features could be adversely affected by oil and gas exploration or development in areas not within sight of the river (no-surface-occupancy stipulations would prevent surface disturbance from oil and gas development within sight of the river). Mining activities could have similar effects anywhere in the WSA.

Effects on Energy and Mineral Development

designated wilderness would be withdrawn from mineral exploration and development. Acreages that would be withdrawn under each alternative, including areas rated with moderate mineral potential, are shown in table 6.

Effects on Wildlife

Wildlife habitat would be preserved in areas designated wilderness.

Impacts by recreationists on waterfowl nesting would be minor since most recreational activity takes place on the river. The time spent on shore is usually in areas unsuitable for nesting. The problem with boaters "pushing" waterfowl downstream would continue under all alternatives. Short-term increases in visitor use projected under the **all wilderness, preferred and partial alternatives** will increase the number of encounters of boaters and Canada geese broods along the river, which will also increase harassment and separation of family groups.

Along the John Day River, grazing has depleted nesting sites for geese near the shoreline. The construction of proposed nest structures (15 in Thirtymile WSA and 50 in Lower John Day WSA) might or might not be allowed, under the all wilderness, preferred and partial alternatives, depending on a site-specific assessment of whether they conform with Wilderness Management Policy. If not allowed, an opportunity to improve nesting and reproduction of Canada geese would be foregone.

The 2.2 miles of riparian fence in the Lower John Day WSA might be appropriate under the all, partial and preferred alternatives, because it would correct the adverse effects of human influence by restoring anadromous fish habitat degraded by livestock grazing. A site-specific assessment would be prepared to determine if it conformed with Wilderness Management Policy.

Both the riparian fencing and goose nest projects would be constructed under the **no wilderness/no action alternative**, resulting in increased fish and goose populations.

Effects on Livestock Grazing

The **all wilderness alternative** would have little effect on livestock grazing in either Thirtymile or Lower John Day WSA. Actual use would not be affected. Under this alternative, closure of ways could restrict the use of motorized vehicles in livestock management unless there were no practical alternatives.

Effects of the **preferred alternative** would be similar to the all wilderness alternative, but it would also include closing a boundary road between the two WSAs which could place additional constraints on livestock management.

Under the **partial alternative**, ways in Thirtymile WSA, and road and ways in Lower John Day WSA

Table 6. Effects of Alternatives on Energy and Mineral Development, Thirtymile (OR-5-1) and Lower John Day (OR-5-6) WSAs

	Acres Withdrawn[1]					
	All Wilderness		Preferred Alternative	Partial		No Wilderness/No Action
	Thirtymile	Lower John Day	(both WSAs combined)	Thirtymile	Lower John Day	(both WSAs)
Total acres	7,538	19,352	22,802[2]	5,686	12,767	0
Oil and gas rated moderate	7,538	19,352	22,802	5,686	12,767	0
Metals rated moderate	3,420	0	3,420	2,770	0	0
Uranium/thorium rated moderate	7,538	0	7,332	5,686	0	0

[1] Includes acreage already under no-surface-occupancy stipulation for existing oil and gas leases.

[2] Development also precluded on an additional 640 acres if private land is acquired as proposed under this alternative.

would be closed to grazing management, unless there were no practical alternative.

There would be no impact on livestock grazing under the **no wilderness/no action alternative**. Grazing management by use of motorized vehicles would continue.

Effects on Recreation Use

Recreation use under the **all wilderness and preferred alternatives** would accelerate in the years immediately following wilderness designation. This increase would be from recreationists who gain access to the area by boat and would be in addition to the normal increases in visitor use that would occur regardless of whether the area was designated wilderness. If necessary to protect naturalness and solitude, as required by Wilderness Management Policy, visitor use levels could be regulated. Vehicle-oriented recreation use by adjacent landowners and their guests would be prohibited on all vehicle ways under the all wilderness alternative. This would reduce recreational activities such as hunting. However, vehicle use could continue on the dead-end road in the Lower John Day WSA.

Under the preferred alternative, vehicle use would be excluded on ways and the dead-end road in the area recommended suitable. If the private inholdings at Horseshoe Bend were acquired, the boundary road (included by combining both WSAs) would also be closed to vehicles and vehicle-oriented recreation activities would decrease.

Under the **partial alternative**, overall recreation use would be slightly higher than the all wilderness alternative because vehicle-oriented recreation by adjacent landowners and their guests on the canyon ridgetops would continue.

Under the **no wilderness/no action alternative**, river recreation is expected to continue to increase. This increase would be from recreationists who gain access to the area by boat. Levels of vehicle-oriented recreation in the WSA are controlled by adjacent landowners. There are no public access routes into the area other than the river. For this reason, the amount of vehicle-oriented recreation in the WSA is expected to be the same under the partial and no wilderness/no action alternatives and remain constant in the future.

Short term river use levels would be slightly lower under the no wilderness/no action alternative than under the all wilderness alternative. Over a long period of time, however, the river recreation would be expected to continue to increase until crowding resulted in resource damage (primarily from camping). At this point, levels of use could be regulated.

However, the level at which such use would begin to be limited under this alternative would likely be at a higher level than under the all wilderness, preferred, or partial alternatives. This is due to the fact that the "carrying capacity" of the canyon to accommodate camping is greater than the "carrying capacity" of the canyon to maintain primitive recreation experiences consistent with Wilderness Management Policy.

Overall, recreation use would be the highest under the no wilderness/no action alternative.

Effects on Economic Value and Local Income

The economic effects for the alternatives are presented in tables 7a-c and 8a-c. Tables 7a-c show the effects on economic value, and tables 8a-c, the effects on local personal income. Oil and gas development might be prohibited, and construction of the proposed projects might or might not be allowed under wilderness designation. The columns for the wilderness alternatives show the effects as a range of values, dependent on whether these projects were allowed.

Currently, there is little dependence on vehicles for livestock management in the study areas. The all wilderness alternative would restrict such vehicle use unless there were no practical alternative. The maximum impact from road closures upon the grazing operators in the WSAs would be an increase in cost of about $20 per year in the Thirtymile WSA and $353 per year in the Lower John Day WSA.

Table 7a. Effects of Alternatives on Annual Economic Value, Thirtymile (OR-5-1) and Lower John Day (OR-5-6) WSAs Combined (1981 price levels)

Item	Unit of Measure	All Wilderness	Preferred Alternative	Partial	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS					
Waterfowl hunting[1]	RVD	0 to +555	0 to +555	0 to +555	+555
Anad. fish reprod.[1]	$	0 to +15,471	0 to +15,471	0 to +15,471	+15,471
Oil & gas leases	Acres	-26,890	-22,802	-18,453	0
VALUE OF PROPOSED INVESTMENTS[2]					
Waterfowl hunting	$	0 to +15,590	0 to +15,590	0 to +15,590	+15,590
Anad. fish reprod.	$	0 to +15,471	0 to +15,471	0 to +15,471	+15,471
Total[3]	$	0 to +27,463	0 to +27,463	0 to +27,463	+27,463
Investments[4]	$	0 to -1,649	0 to -1,649	0 to -1,649	-1,649
Net economic value	$	0 to +29,412	0 to +29,412	0 to +29,412	+29,412
VALUE OF OTHER EXPECTED CHANGES IN OUTPUTS					
Oil and gas leases	$	-26,890	-22,802	-18,453	0
Reduced access[5]	$	-373	-373	-373	0
Total	$	-27,263	-23,175	-18,826	0
VALUE OF TOTAL EXPECTED CHANGES IN OUTPUTS					
All categories	$	-27,263 to +2,149	-23,175 to +6,236	-18,826 to +10,586	+29,412

[1] Expected future increases from proposed structural wildlife projects.
[2] Structural projects involving up to $50,932 in total expenditures, including construction and maintenance.
[3] Detail may not sum to "Total" due to rounding.
[4] Average annual cost of investment expenditures amortized at 7.8% over 50-year period.
[5] Additional cost (shown as negative value) due to restriction of vehicular access for livestock operator.

Table 7b. Effects of Alternatives on Annual Economic Value, Thirtymile WSA (OR-5-1) (1981 price levels)

Item	Unit of Measure	All Wilderness	Preferred Alternative[1]	Partial	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS					
Waterfouwl hunting[2]	RVD	0 to +128	0 to +128	0 to +128	+128
Oil & gas leases	Acres	-7,538	-7,332	-5,686	0
VALUE OF PROPOSED INVESTMENTS[3]					
Waterfowl hunting	$	0 to +3,598	0 to +3,598	0 to +3,598	+3,598
Investments[4]	$	0 to -263	0 to -263	0 to -263	-263
Net economic value	$	0 to +3,335	0 to +3,335	0 to +3,335	+3,335
VALUE OF OTHER EXPECTED CHANGES IN OUTPUTS					
Oil and gas leases	$	-7,538	-7,332	-5,686	0
Reduced access[5]	$	-20	-20	-20	0
Total	$	-7,558	-7,352	-5,706	0
VALUE OF TOTAL EXPECTED CHANGES IN OUTPUTS					
All categories	$	-7,558 to -4,223	-7,352 to -4,017	-5,706 to -2,371	+3,335

[1] Represents effects related to this WSA only. See table 7a for combined effects of preferred alternative.
[2] Expected future increases from proposed stuctural wildlife projects.
[3] Structural projects involving up to $8,880 in total expenditures, including construction and maintenance.
[4] Average annual cost of investment expenditures amortized at 7.875% over 50-year period.
[5] Additional cost (shown as negative value) due to restriction of vehicular access for livestock operator.

Table 7c. Effects of Alternatives on Annual Economic Value, Lower John Day WSA (OR-5-6) (1981 price levels)

Item	Unit of Measure	All Wilderness	Preferred Alternative[1]	Partial	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS					
Waterfowl hunting[2]	RVD	0 to +427	0 to +427	0 to +427	+427
Anad. fish reprod.[2]	$	0 to +15,471	0 to +15,471	0 to +15,471	+15,471
Oil & gas leases	Acres	-19,352	-15,470	-12,767	0
VALUE OF PROPOSED INVESTMENTS[3]					
Waterfowl hunting	$	0 to +11,992	0 to +11,992	0 to +11,992	+11,992
Anad. fish reprod.	$	0 to +15,471	0 to +15,471	0 to +15,471	+15,471
Total[4]		$	0 to +27,463	0 to +27,463	0 to+27,463
Investments[5]		$	0 to -1,386	0 to -1,386	0 to -1.386
		+26,077	$	0 to +26,077	0 to +26,077
VALUE OF OTHER EXPECTED CHANGES IN OUTPUTS					
Oil and gas leases	$	-19,352	-15,470	-12,767	0
Reduced access[6]	$	-353	-353	-353	0
Total	$	-19,705	-15,823	-13,120	0
VALUE OF TOTAL EXPECTED CHANGES IN OUTPUTS					
All categories	$	-19,705 to +6,372	-15,823 to +10,254	-13,120 to +12,957	+26,077

[1] Represents effects related to this WSA only. See table 7a for combined effects of preferred alternative.
[2] Expected future increases from proposed structural wildlife projects.
[3] Structural projects involving up to $42,052 in total expenditures, including construction and maintenance.
[4] Detail may not sum to "Total" due to rounding.
[5] Average annual cost of investment expenditures amortized at 7.8% over 50-year period.
[6] Additional cost (shown as negative value) due to restriction of vehicular access for livestock operator.

Table 8a. Effects of Alternatives on Local Personal Income, Thirtymile (OR-5-1) and Lower John Day (OR-5-6) WSAs Combined (1981 price levels)

Item	Unit of Measure	All Wilderness	Preferred Alternative	Partial	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS					
Waterfowl hunting[1]	RVD	0 to +555	0 to +555	0 to +555	+555
Anad. fish reprod.[1]	$	0 to +15,471	0 to +15,471	0 to +15,471	+15,471
Oil & gas leases	Acres	-26,890	-22,802	-18,453	0
INCOME FROM PROPOSED INVESTMENTS[2]					
Waterfowl hunting	$	0 to +4,079	0 to +4,079	0 to +4,079	+4,079
Anad. fish reprod.	$	Unknown	Unknown	Unknown	Unknown
Construction activity[3]	$	0 to +829	0 to +829	0 to +829	+829
Total[4]	$	0 to +4,079	0 to +4,079	0 to +4,079	+4,079
INCOME FROM OTHER EXPECTED OUTPUT CHANGES					
Oil and gas leases	$	-8,099	-6,867	-5,542	0
INCOME FROM ALL OUTPUT CHANGES					
All categories[4]	$	-8,099 to -4,020	-6,867 to -2,788	-5,542 to -1,463	+4,079

[1] Expected future increases from proposed structural wildlife projects.
[2] Structural projects involving up to $50,932 in total expenditures, including construction and maintenance.
[3] Local personal income generated annually during assumed 5-year construction period. This amount cannot be added to the income resulting from grazing and hunting activity because it is not sustained over the analysis period.
[4] Detail may not sum to "Total" due to rounding. Total omits income from construction which is limited to 5-year period. See footnote 3.

Table 8b. Effects of Alternatives on Local Personal Income, Thirtymile WSA (OR-5-1) (1981 price levels)

Item	Unit of Measure	All Wilderness	Preferred Alternative[1]	No Wilderness/ Partial	No Action
CHANGES IN RESOURCE OUTPUTS					
Waterfowl hunting[2]	RVD	0 to +128	0 to +128	0 to +128	+128
Oil & gas leases	Acres	-7,538	-7,332	-5,686	0
INCOME FROM PROPOSED INVESTMENTS[3]					
Waterfowl hunting	$	0 to +941	0 to +941	0 to +941	+941
Construction activity[4]	$	0 to +132	0 to +132	0 to +132	+132
Total	$	0 to +941	0 to +941	0 to +941	+941
INCOME FROM OTHER EXPECTED OUTPUT CHANGES					
Oil and gas leases	$	-2,271	-2,208	-1,697	0
INCOME FROM ALL OUTPUT CHANGES					
All categories	$	-2,271 to -1,330	-2,208 to -1,267	-1,697 to -756	+941

[1] Represents effects related to this WSA only. See Table 8a for combined effects of preferred alternative.

[2] Expected future increases from proposed structural wildlife projects.

[3] Structural projects involving up to $8,880 in total expenditures, including construction and maintenance.

[4] Local personal income generated annually during assumed 5-year construction period. This amount cannot be added to the income resulting from grazing and hunting activity because it is not sustained over the analysis period.

Table 8c. Effects of Alternatives on Local Personal Income, Lower John Day WSA (OR-5-6) (1981 price levels)

Item	Unit of Measure	All Wilderness	Preferred Alternative[1]	Partial	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS					
Waterfowl hunting[2]	RVD	0 to +427	0 to +427	0 to +427	+427
Oil & gas leases	Acres	-19,352	-15,470	-12,767	0
INCOME FROM PROPOSED INVESTMENTS[3]					
Waterfowl hunting	$	0 to +3,138	0 to +3,138	0 to +3,138	+3,138
Construction activity[4]	$	0 to +697	0 to +697	0 to +697	+697
Total[5]	$	0 to +3,138	0 to +3,138	O to +3,138	+3,138
INCOME FROM OTHER EXPECTED OUTPUT CHANGES					
Oil and gas leases	$	-5,828	-4,659	-3,845	0
INCOME FROM ALL OUTPUT CHANGES					
All categories[5]	$	-5,828 to -2,690	-4,659 to -1,521	-3,845 to -707	+3,138

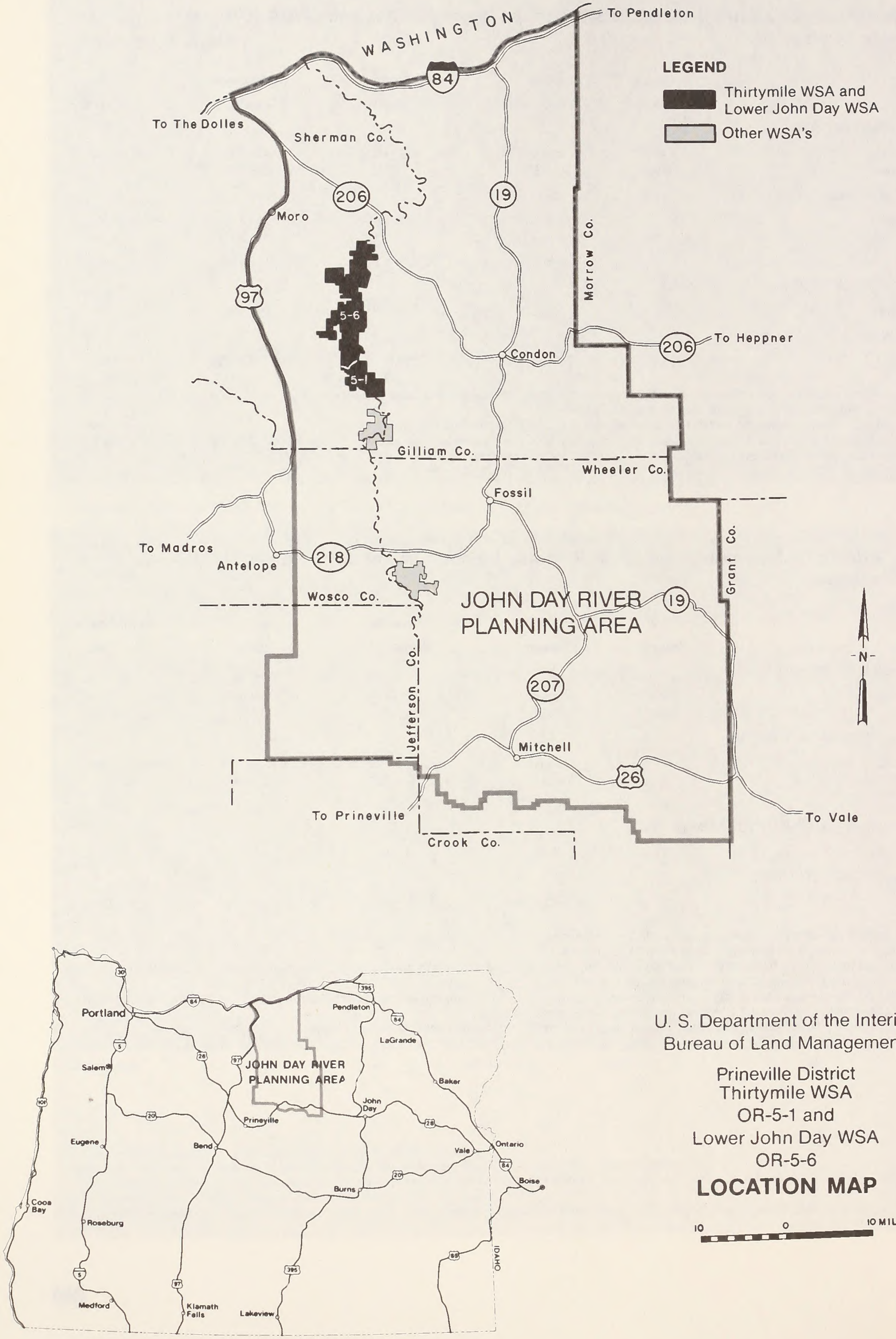
[1] Represents effects related to this WSA only. See table 8a for combined effects of preferred alternative.

[2] Expected future increases from proposed structural wildlife projects.

[3] Structural projects involving up to $42,052 in total expenditures, including construction and maintenance. (Increased income attributable to increased anadromous fish reproduction would occur mainly outside the local area, and has not been estimated.)

[4] Local personal income generated annually during assumed 5-year construction period. This amount cannot be added to the income resulting from grazing and hunting activity because it is not sustained over the analysis period.

[5] Detail may not sum to "Total" due to rounding. Total omits income from construction which is limited to 5-year period. See footnote 4.



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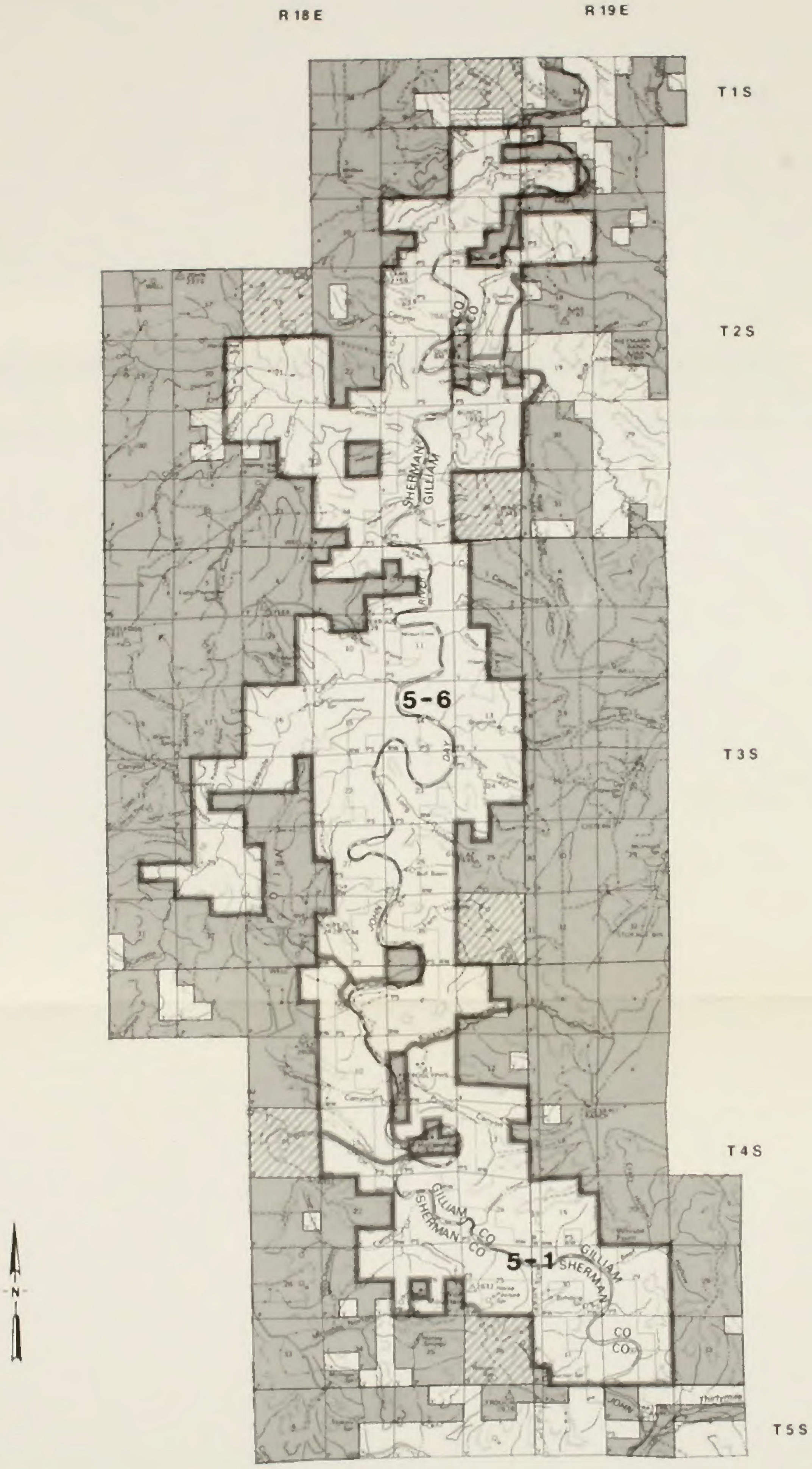
Prineville District
Thirtymile WSA
OR-5-1 and
Lower John Day WSA
OR-5-6

LOCATION MAP

MAP 1



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Prineville District

Thirtymile WSA
OR-5-1 and
Lower John Day WSA
OR-5-6

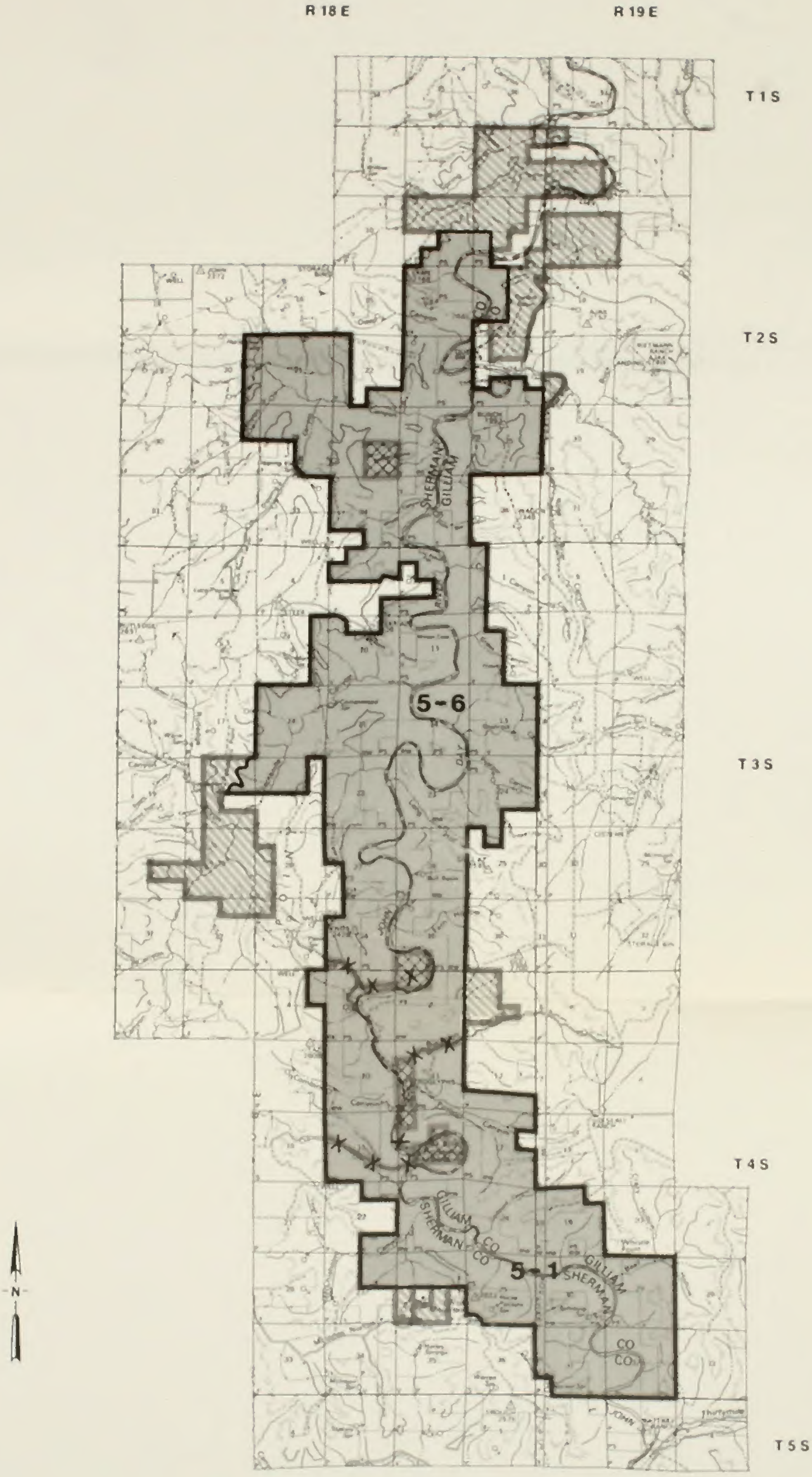
LAND OWNERSHIP

1 0 1 2 MILES

LEGEND

▬	Wilderness Study Area Boundary
☐	Bureau of Land Management
▨	State
■	Private
▤	BLM Surface-State or Private Subsurface (Split Estate)

MAP 2



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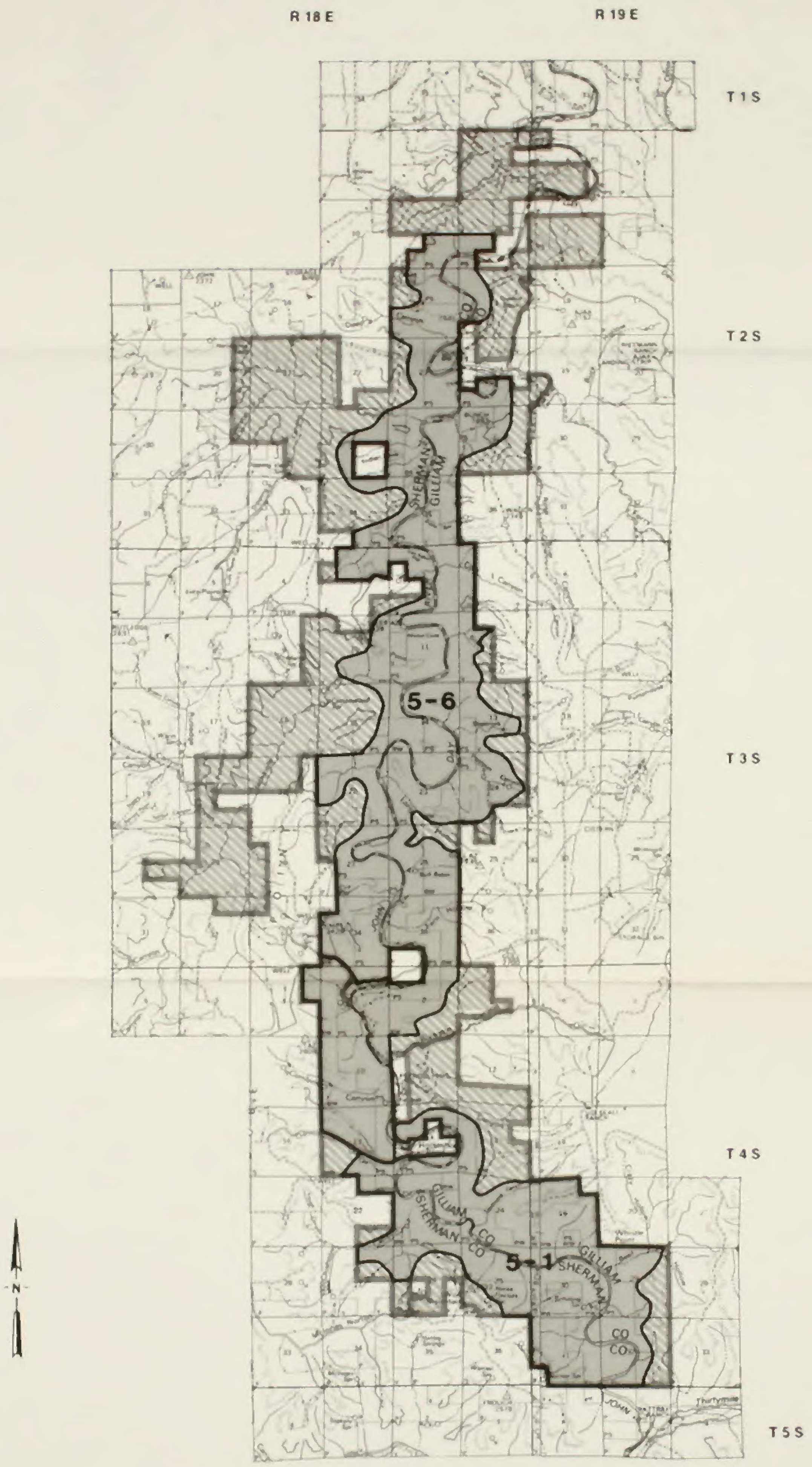
PREFERRED ALTERNATIVE

1 0 1 2 MILES

LEGEND

- — Wilderness Study Area Boundary
- ▭ Recommended Suitable for Wilderness
- ▨ Recommended Non-suitable for Wilderness
- ▩ Non-Federal Land within Recommended Wilderness
- ✕—✕ Recommended Road Closure

MAP 3



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PARTIAL ALTERNATIVE

1 0 1 2 MILES

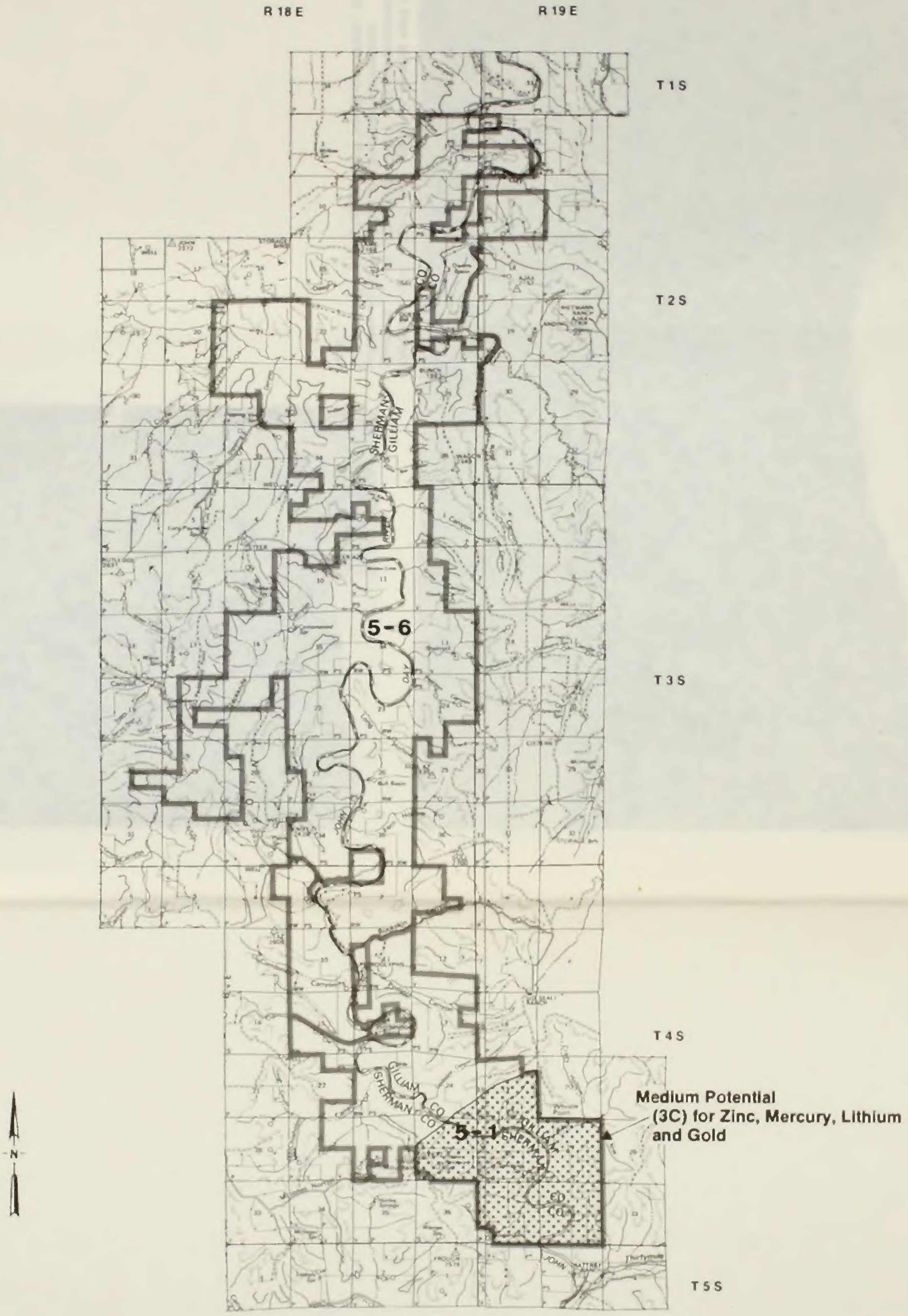
LEGEND

▬ Wilderness Study Area Boundary

▢ Recommended Suitable for Wilderness

▨ Recommended Non-suitable for Wilderness

MAP 4



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Thirtymile WSA
OR-5-1 and
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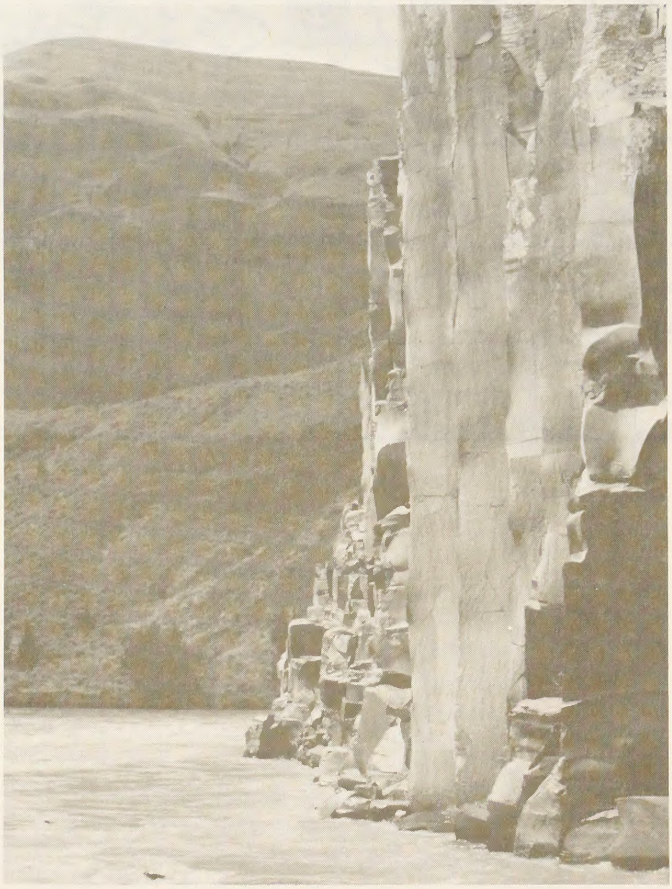
OR-5-6

MEDIUM OR HIGH POTENTIAL
MINERAL OR ENERGY RESOURCES

Entire WSA:
Medium Potential
(3C) for Oil and Gas
(3B) for Uranium

MAP 5

Thirtymile WSA, OR-5-1. John Day River, looking west in the southern portion of the WSA. Within area recommended suitable under the partial and preferred alternatives. Illustrates the steep, rugged John Day River Canyon. October 1978.



Thirtymile WSA, OR-5-1. John Day River, looking west in the central portion of the WSA. Within area recommended suitable under the partial and preferred alternatives. Illustrates massive basalt columns near Cordwood Canyon.October 1978.

Lower John Day WSA, OR-5-6. Looking north into the north-central portion of the WSA. Within area recommended suitable under the partial and preferred alternatives. Example of basalt pinnacles in the John Day River Canyon. October 1978.

Lower John Day WSA, OR-5-6. Looking northeast downstream from Jacknife Canyon. Within area recommended suitable under the partial and preferred alternatives (the tablelands out of sight from the river are nonsuitable under the partial alternative). Shows the John Day River Canyon and the flatter tablelands above the river. January 1980.

Appendix to the Wilderness Environmental Impact Statement for Oregon

North Pole Ridge Wilderness Study Area (OR-5-8)

General Description of Study Area

North Pole Ridge wilderness study area (WSA) is located along approximately 6 river miles of the John Day River, about 15 miles northwest of Fossil, Oregon, and 65 miles northeast of Madras, Oregon (see map 1). It is about 120 miles southeast of Portland, Oregon. U.S. Highway 97 is 10 miles west of the area. Within the WSA, the John Day River forms the boundary between Sherman and Gilliam Counties.

Except for projections on the north and south, North Pole Ridge WSA is basically rectangular, running three miles north to south and four miles east to west (see map 2). The original wilderness inventory identified 6,062 acres of public land within the North Pole Ridge WSA and four tracts of private land inholdings totaling 240 acres. Two errors in those original calculations have since been discovered.

A constructed and maintained road in the northeast corner of the study area separates 13 acres of public land from the remainder of the area. In the southwest corner of the study area, 200 acres of land thought to be private land were discovered to be public land and have since been added to the WSA. The revised acreage of public land for this WSA is 6,249 acres. The 240 acres of private inholdings remain unchanged.

The western, southern and eastern boundaries of the study area are formed by the borders between private, state and public lands. The northern boundary is formed by the border between public and private lands and a utility gas pipeline and maintenance road.

Private land surrounding the WSA prevents legal public access by road. Public access to the WSA is possible only by floating the John Day River. The main put-in point is located at Clarno where State Highway 218 crosses the John Day River, and the main take-out point is at Cottonwood Bridge where State Highway 206 crosses the John Day River.

The main feature of the WSA is the 800- to 1,600-foot-deep John Day River Canyon. Columbia River basalt cliffs and escarpments are interspersed with talus slopes and steep, bunchgrass-covered slopes. Fourteen side canyons enter the John Day River within the WSA.

The John Day River is a north-flowing tributary of the Columbia River. It has an average flow fluctuating from 10,000 cubic feet per second in early spring to less than 100 cubic feet per second in late summer, due to natural seasonal variation and irrigation use during the growing season.

Water quality of the John Day River meets state quality standards. Several springs make up the only other water source within the WSA.

Vegetation in the WSA is a big sagebrush/bunchgrass community. Juniper trees are scattered throughout the area. Side canyons with springs have small riparian zones.

Interrelationships

A strip of public land about 1.5 miles wide separates Thirtymile WSA from North Pole Ridge WSA. This land serves as a utility corridor for a 36-inch buried gas pipeline and maintenance road. A permit has also been issued for construction of another 42-inch gas pipeline through this same corridor in the near future.

Some 147 miles of the John Day River, including the portion passing through the WSA, have been identified as a State Scenic Waterway, which provides some State control over land use changes within a half-mile-wide river corridor. Also, the National Park Service has concluded that the State Scenic stretch of the John Day River meets criteria for a National Scenic River, although no action has been taken on their recommendation.

A portion of the WSA adjacent to the John Day River is also part of power site reserves which earmark the land for potential waterpower and water storage development. These 'withdrawals' are scheduled for review in the next few years, which may lead to their revocation. Power site or water storage development is not foreseen, and therefore not discussed further. (See the Interrelationships section of the Statewide EIS volume.)

The entire WSA falls within lands ceded to the U.S. Government by the Warm Springs Indian Tribe by ratified treaty. This treaty reserved to the Indians rights for hunting, fishing and gathering in usual and accustomed places and grazing stock on unclaimed lands.

The Oregon Department of Fish and Wildlife has identified this area as suitable for reintroduction of California bighorn sheep.

Issues

Issues relating to each WSA were raised by BLM and the public during the wilderness inventory and EIS planning and scoping process. These issues concern both the effects of wilderness designation on existing and potential land uses or resources in the WSA, as well as the effects of existing and potential land uses or resources on wilderness values. Land uses or resources raised as issues specifically for this WSA include:

- existing oil and gas leasing and potential exploration and development,

- possible changes in the amount of recreation use in North Pole Ridge WSA and effects on nesting of migrating waterfowl, and

- existence of private inholdings and possible resulting problems from trespass, litter and vandalism, and methods of controlling it. (Effects of wilderness designation on private lands are addressed in the Statewide EIS volume.)

Also raised as an issue was the possibility of placing a major burden on local county governments from additional responsibilities (such as, intensive fire management and control programs and visitor assistance programs like search and rescue), which might be needed if North Pole Ridge WSA were designated wilderness. (This issue is not addressed because substantial visitor use increases are not expected to result from designation.)

Description of the Alternatives

The following alternatives are analyzed:

- all wilderness
- preferred alternative
- partial
- no wilderness/no action

An enhanced alternative was not analyzed because no feasible alternative exists to significantly enhance wilderness values beyond the all wilderness or preferred alternatives.

Another alternative considered but not analyzed was the possibility of recommending the 1,750 acres of public land between the North Pole Ridge WSA and the Thirtymile WSA as suitable for wilderness designation and combining the two areas into one larger area. This is not feasible because of the existing 36-inch buried gas pipeline and adjacent maintenance road. Use and maintenance of this road will continue and possibly increase with construction of an additional pipeline through this corridor in the near future.

All Wilderness

Under the all wilderness alternative, all 6,249 acres of public land in the North Pole Ridge WSA would be recommended as suitable for wilderness designation (see map 2). For purposes of analysis, it is assumed the 240 acres of private inholdings would not be acquired.

Preferred Alternative

Under the preferred alternative, 5,710 acres would be recommended as suitable for wilderness designation (see map 3) and the remaining 539 acres in the north part of the WSA near Pine Hollow Canyon would be recommended as nonsuitable.

The boundary between the suitable and nonsuitable portions would be a way (a vehicle route established and maintained solely by the passage of vehicles) on the top of North Pole Ridge. The boundary of the WSA would also be modified to include one additional 40-acre private parcel adjacent to the WSA. An attempt would be made to acquire this parcel and the 240 acres of private inholdings through purchase or exchange with willing owners.

Total area recommended suitable under this alternative, assuming the private parcels were acquired, would be 5,990 acres.

Partial

Under the partial alternative, 5,212 acres of public land (the portion of the WSA visible from the river) would be recommended suitable as wilderness (see map 4).

All but 80 acres of private inholdings would be outside the area recommended suitable under this alternative. For purposes of analysis it is assumed the private inholdings in the suitable area would not be acquired. The 1,037 acres recommended nonsuitable lie outside the area that can be seen from river level. These lands are beyond the rims of the John Day River Canyon. Portions of Big Gulch, Little Gulch and Zig Zag Canyon, are recommended as nonsuitable for wilderness designation under this alternative. Most of these side canyons have outstanding naturalness and opportunities for solitude and primitive recreation.

No Wilderness/No Action

The no wilderness/no action alternative would recommend the entire WSA nonsuitable as wilderness. It represents the situation most likely to occur without wilderness designation. The area would be managed according to the current land use plan, which includes the following features relevant to this analysis:

- continued availability for oil and gas and other mineral exploration and development, with no-surface-occupancy restrictions on leases within sight of the river, and

- continued use of motor vehicles in limited portions of the WSA.

Table 1 summarizes the proposed management of the WSA under each alternative.

Table 2 summarizes the environmental consequences of each alternative.

Manageability of the Area as Wilderness

The area would be manageable as wilderness under the all wilderness, enhanced wilderness and partial alternatives.

The major factor complicating wilderness

Table 1. Summary of Proposed Management Under Each Alternative, North Pole Ridge WSA (OR-5-8)

Proposed Management	All Wilderness	Preferred	Partial	No Wilderness/ No Action
Acres Designated as Wilderness	6,249	5,710	5,212	0
Acres Closed to ORVs by Wilderness Designation	6,249	5,710	5,212	0
Miles of Ways Closed	2.9	2.4	2.0	0
Acres of Full Fee Estate Acquired[1]	0	280	0	0
Acres Withdrawn from Mineral Location and Leasing by Wilderness Designation	6,249	5,710	5,212	0
Structural Wildlife Projects Developed:				
Nest Structures	0-10	0-10	0-10	10

[1] Upon acquisition, these additional lands would be incorporated into the wilderness area, closed to vehicle use, and withdrawn from mineral location and leasing.

Table 2. Summary of Environmental Consequences of Alternatives, North Pole Ridge WSA (OR-5-8)

Resource or Activity	All Wilderness	Preferred Alternative	Partial	No Wilderness/No Action
Wilderness Values	Would add 6,249 acres to the NWPS including 6 miles of the John Day River. Closure of 2.9 miles of ways would enhance naturalness by allowing them to revegetate. Elimination of vehicle use on the ways would also enhance opportunities for solitude and primitive recreation.	Would add 5,990 acres to the NWPS, assuming private parcels could be acquired, including 6 miles of the John Day River. Closure of 2.4 miles of ways would enhance naturalness. Elimination of vehicle use on the ways would also enhance opportunities for solitude and primitive recreation. Resource development or other activities could adversely affect the limited wilderness values in the area recommended as nonsuitable.	Would add 5,212 acres to the NWPS, including 6 miles of the John Day River. Closure of 2 miles of ways would enhance naturalness. Elimination of vehicle use on the ways would also enhance opportunities for solitude and primitive recreation. Wilderness characteristics in upland areas could be adversely affected by surface disturbing activites on land outside the viewed area of the canyon. Potential conflicts on 160 acres of private inholdings would be eliminated.	Wilderness characteristics could be adversely affected by future mineral exploration and development, including oil and gas development, and other projects.
Energy and Mineral Development	Development precluded on 6,249 acres, including 6,249 acres with moderate potential for metallic minerals. Development for oil and gas precluded on 1,037 acres not presently protected by restrictive stipulations.	Development precluded on 5,710 acres, plus an additional 280 acres of private inholdings if acquired, including 5,710 acres with moderate potential for metallic minerals. Development for oil and gas precluded on 498 acres not presently protected by restrictive stipulations.	Development precluded on 5,212 acres with moderate potential for metallic minerals.	No impact.
Wildlife	Goose nesting project might be foregone. No significant impact.	Same as all wilderness.	Same as all wilderness.	Goose nesting project built, increasing goose production. No significant impact.
Livestock Grazing	Possible closing of 2.9 miles of ways. No significant impact.	Possible closing of 2.4 miles of ways. No significant impact.	Possible closing of 2 miles of ways. No significant impact.	No impact.
Recreation Use	Vehicle-oriented recreation use would be displaced. Overall recreation use would increase slightly after designation, in addition to normal increases. Limitations on use could be implemented if crowding occurs.	Same as all wilderness.	Same as all wilderness except vehicle-oriented recreation on ridgetops would continue. Overall recreation use increase slightly higher than all wilderness and preferred.	Normal increase would continue. Recreation use would be highest under this alternative. Limitations on use levels would be implemented if campsites deteriorate.
Economic Value and Local Income	Decrease in economic value and local personal income by $6,359 and $1,882, respectively, if proposed projects were not allowed, and from loss of oil and gas leases. Decrease in economic value and local personal income by $4,136 and $1,206, respectively, if proposed projects were allowed, including loss of oil and gas leases. The maximum increase in transportation costs to livestock operators would be $110.	Decrease in economic value and local personal income by $5,820 and $1,720, respectively if proposed projects were not allowed and from loss of oil and gas leases. Decrease in economic value and local personal income by $3,597 and $1,044, respectively, if proposed projects were allowed, including loss of oil and gas leases. The maximum increase in transportation costs to livestock operators would be $110.	Decrease in economic value and local personal income by $5,322 and $1,570, respectively, if proposed projects were not allowed and from loss of oil and gas leases. Decrease in economic value and local personal income by $3,099 and and $894, respectively, if proposed projects were allowed, including loss of oil and gas leases. The maximum increase in transportation costs to livestock operators would be $110.	Increase in economic value and local personal income by $2,223 and $676, respectively, from construction of proposed projects.

manageability is the four private inholdings, which are used for livestock grazing. This use could change in the future at the discretion of the landowner; however, there has been no indication that present use would change.

Rationale for Selection of the Preferred Alternative

The majority of the WSA would be recommended suitable as wilderness because the benefits of preserving wilderness values in that portion would outweigh the benefits of retaining options for development of potential mineral resources.

The area recommended suitable provides a wilderness experience unique in this region. Floating or hiking through a major river canyon up to 1,600 feet deep in near natural condition is a rare opportunity. The area is characterized by steep, rocky bluffs and numerous side canyons which offer outstanding opportunities for solitude and a wide range of primitive types of recreation. These qualities, coupled with special wilderness features such as a high density of prehistoric and historic sites, anadromous and warm water fish populations and unique vegetative communities, make the John Day River Canyon an area of outstanding natural qualities.

The area designated wilderness under this alternative would include all of the John Day River Canyon in the WSA, as well as most side canyons; it would also include the identified cultural resource sites and nearly all areas having outstanding wilderness qualities.

The 539 acres in the north that would be recommended nonsuitable under the preferred alternative have few wilderness values. This area has no river frontage. In addition, this tract is predominantly a north-facing slope overlooking Pine Hollow Canyon, where a buried gas pipeline utility corridor is located. The gas line cannot be seen, but the maintenance road and periodic vehicle travel on it reduce the naturalness of the area. Sights and sounds from a private ranching operation located within 1/4 mile of the WSA, across the river in Thirtymile Canyon, adversely affect naturalness and solitude in this part of the WSA.

Affected Environment

This section discusses only those activities or resources that influence the character of the study area, or that may be affected by the alternatives.

Wilderness Values

Naturalness

Almost all of the study area remains in a near natural condition and is affected primarily by the forces of nature. A few minor man-made features are dispersed throughout the WSA. These features include 1.8 miles of fence, 1 reservoir and 2.9 miles of ways, mostly on the ridge tops. Some ways are reverting to a natural appearance. However, an old constructed way (established to investigate a potential dam site at "The Narrows"), leading down from the top of the canyon to the John Day River, is still apparent. Erosion and vegetation are slowly beginning to revert this way to a more natural appearance.

The cumulative effect of these man-made features is not significant due to the type of features, the size and shape of the area, outstanding topographic screening, and the dispersal of the features in the WSA. Approximately 26 percent of the WSA are influenced by these developments. (The area of influence is an estimate of the acreage from which the man-made features can be seen.)

The meanderings of the John Day River cutting across the Columbia plateau create many bends with few straight stretches of river. As a result, floating recreationists encounter very few man-made features along the river at any one time. This allows visitors to float or hike in an area that generally remains in a natural condition.

Opportunities for Solitude or Primitive and Unconfined Types of Recreation

Outstanding opportunities for solitude exist in most of the WSA, particularly within the main canyon of the John Day River. There are also outstanding opportunities for solitude in most of the isolated side canyons and on plateaus within the study area.

A unique type of solitude can be obtained by floating or hiking within the study area. The reddish brown basalt canyons range in depth from 800 to 1,600 feet and totally engulf the individual, giving one a complete feeling of being alone.

There are six areas outside the main canyon with secluded spots. These areas include portions of the South Fork of Pete Enyart, Big Gulch, Little Gulch, and Zig Zag Canyons, a ravine near the southern boundary, and a high plateau over 1,800 feet above the John Day River along the southern boundary.

The Kent natural gas booster station is 5 miles west of the WSA and, while it cannot be seen from the area, it can be heard from much of the WSA. Periodic low-elevation flights over the John Day canyon by military jets are another outside influence that adversely affects solitude. However, these sights and sounds are temporary and do not significantly affect the outstanding opportunities for solitude in the WSA.

Outstanding opportunities for primitive and unconfined recreation within the WSA include whitewater boating on the John Day River by raft, drift boat, canoe or kayak during the late spring and early summer months (a period of 3 to 4 months depending on river levels). Factors which make this opportunity outstanding are:

- a variety of fast to slow moving water, intermixed with a few challenging rapids within the WSA,

- outstanding scenic quality of the John Day River canyon while floating through the WSA,

- opportunities to fish, camp and view wildlife and historic, geologic and archeological sites,

- opportunity to see an area that is predominantly unimpaired in its natural beauty and character, and

- the length of the river trip -- 2 to 4 days, or longer if desired. While one can float through the study area in 2 to 3 hours, limitations on access to the river require a much longer trip.

There is fishing for smallmouth bass, squawfish, bullhead, channel catfish, carp, chinook salmon and steelhead along the river within the WSA. Seven side canyons of the John Day River within the study area offer outstanding day hikes.

Opportunities for sightseeing and photography of the features mentioned above are also outstanding. This area offers opportunities for backpacking, camping, wildlife observation, hunting, and horseback riding; however, they are less than outstanding.

Special Features

There are several special wilderness features in the WSA:

North Pole Ridge WSA lies within the largest continental basalt flow formation in the world (Columbia River Basalt Group). The John Day River cut a dramatic cross section through this plateau as it formed the John Day Canyon. This is especially evident at the Red Wall, a highly scenic section of the John Day Canyon within the WSA.

The WSA contains 6 miles of the John Day River with scattered wet areas of lush vegetation which contrast against an otherwise dry landscape.

Two plant species of special interest are known or suspected to occur in the WSA: *Castilleja xanthotricha* and, *Collomia macrocalyx*. (These plants are discussed further in the Vegetation section.)

The John Day River provides aquatic habitat for steelhead trout and chinook salmon (some of Oregon's last remaining native salmonid runs).

Prehistoric sites are found within the WSA. (These are discussed further in the Cultural Resources section.)

The WSA contains vegetation representative of a climax bluebunch wheatgrass ecosystem. (Climax is the relatively stable, final stage in the succession of vegetation types, generally equated with pristine.) There are opportunities to study native range sites which could be useful for vegetative comparison and could be maintained as pristine plant reserves.

Diversity in the National Wilderness Preservation System (NWPS)

According to the Bailey/Küchler system of classifying ecosystems, the North Pole Ridge WSA is located within the Palouse Grassland Province and the potential natural vegetation is sagebrush steppe and wheatgrass-bluegrass. Of the plant communities listed in the High Lava Plains and Columbia Basin section of the Oregon Natural Heritage Plan, the WSA contains the big sagebrush/bluebunch wheatgrass, big sagebrush/Idaho fescue, rigid sagebrush/Sandberg's bluegrass, bluebunch wheatgrass/Sandberg's bluegrass, and Idaho fescue/bluebunch wheatgrass ecosystems.

There are several standard metropolitan statistical areas with populations over 100,000 within 5 hours' drive of the North Pole Ridge WSA: Eugene/Springfield, Portland and Salem, Oregon; and Richland/Kennewick/Pasco, Yakima and Tacoma/Seattle/Everett, Washington.

Energy and Mineral Development

Energy and mineral resources were evaluated from available geologic data supplemented by a limited amount of reconnaissance geochemical rock chip sampling. Technical details of the findings of the evaluation are found in a BLM report and file titled "Assessment of Geology, Energy, and Minerals (GEM) Resources, Lower John Day River Geologic Resource Area." The WSA is within the Lower John Day River geologic resource area which has been classified according to a rating system that indicates both the potential for occurrence (geologic favorability) of certain minerals, as well as the quantity and quality of data on which the rating is based (confidence level). A description of the rating system is provided in the Statewide EIS volume.

Rock chip samples indicate moderate potential for gold and zinc in the WSA. Zinc is a strategic and critical mineral; however no deposits of strategic and critical minerals are known to exist in the WSA.

Oil and gas development has a moderate potential based on several factors. Several oil and gas exploration wells have been drilled south of the WSA with one of the wells recovering gas. In the same area there are three reported asphalt occurrences. Near Condon, a deep well had a slight oil show. The discovery of subcommercial gas in Washington beneath the Columbia River Basalt Group indicates gas was generated and preserved in areas similar to the WSA.

The combination of surface and subsurface hydrocarbon shows, surface and subsurface geology, and current oil and gas leasing (as of January 1, 1984, the entire WSA was covered by 3 oil and gas leases) all lead to a rating of moderate potential for oil and gas in the entire WSA.

Current management restricts oil and gas exploration and development in the area seen from the John Day River by stipulating no surface occupancy on all leases. There are 1,037 acres outside this viewable area which are not restricted by a no-surface-occupancy stipulation.

Table 3 shows the mineral potential classifications for the WSA.

There were no mining claims and no geothermal leases in the WSA as of January 1, 1984.

Exposed rocks in the WSA are Tertiary flood-type basalt flows. The subsurface rocks are inferred from oil and gas exploration wells to include Cretaceous marine clastic sediments and pre-Cretaceous marine sediments and metamorphased sediments.

Vegetation

Vegetation in the North Pole Ridge WSA is generally a sagebrush bunchgrass type with varying amounts of western juniper, especially in the draws. Other plants include bitterbrush, snakeweed, rabbitbrush, mock orange, cheatgrass, lupine, paintbrush, needlegrass and other grasses and forbs.

The potential climax vegetation of most of the WSA is bluebunch wheatgrass with some big sagebrush.

Table 3. Classification of Energy and Mineral Potential, North Pole Ridge WSA (OR-5-8)

Commodity	Area	Classification Level	Confidence Level
Metals (gold, zinc)	Entire WSA	3	C
Diatomite	Entire WSA	1	B
Limestone	Entire WSA	1	B
Zeolites	Entire WSA	1	B
Bentonite	Entire WSA	1	B
Uranium/Thorium	Entire WSA	1	B
Geothermal	Entire WSA	1	C
Oil/Gas	Entire WSA	3	C
Sodium/Potassium	Entire WSA	1	B
Coal	Entire WSA	1	B
Tar Sands/Oil Shale	Entire WSA	1	B
Sand and Gravel	Entire WSA	1	C
Crushable Rock	Entire WSA	2	C

Legend:
C1ass 1 - Lack of indications of favorability
Class 2 - Low favorability
Class 3 - Moderate favorability
Class 4 - High favorability

Confidence Level A - Insufficient data or no direct evidence
Confidence Level B - Indirect evidence available
Confidence Level C - Direct evidence but quantitatively minimal
Confidence Level D - Abundant direct and indirect evidence

Vegetation of the WSA is generally early seral (a stage of ecological condition based on the difference between present plant community and climax vegetation) in the drainages, along the John Day River, and in areas of gentle topography, due to past livestock use. Species present include cheatgrass and other weedy annuals, snakeweed, and sagebrush. As either slope or distance from water increases, the vegetation tends toward climax.

Many steep slopes and ridges far from water are almost 100 percent bluebunch wheatgrass, with Idaho fescue on some of the north slopes. These sites have the potential to be "comparison areas," or sites which could be preserved as examples of the once dominant, climax vegetation of this ecosystem. There is often a gradual gradation of ecological stages between the early seral stage, accessible areas and the climax, inaccessible areas.

Two plant species (mentioned in the Special Features section) are of special interest: *Castilleja xanthotricha* (yellow hairy Indian paintbrush) is known to occur in the WSA, and *Collomia macrocalyx* (bristle-flowered collomia) is suspected to occur in the WSA. Both plants are candidate species for federal listing as threatened or endangered.

Wildlife

Game animals in the study area include mule deer, chukar and Hungarian partridge, California quail, and waterfowl. Fur bearers, several species of other small mammals, reptiles and amphibians, and nongame birds also inhabit the study area. Game fish in the John Day River include steelhead trout, spring chinook salmon, smallmouth bass, brown bullhead and channel catfish. Northern squawfish, suckers, and several other nongame species are also present in the WSA.

River riparian habitat within the study area totals approximately 30 acres along 6.5 miles. Present habitat condition is poor. No crucial deer winter range or critical habitats have been identified in the study area. Historically, California bighorn sheep inhabited the John Day River Canyon area and are currently being considered by the Oregon Department of Fish and Wildlife for reintroduction. The northern bald eagle, which is federally listed as threatened in Oregon, is an occasional winter visitor to the area.

Ten waterfowl nest structures are proposed for construction within the WSA to improve nesting availability and reproduction of Canada geese.

A problem for waterfowl exists during brood/rearing with boaters 'pushing' juvenile ducks and geese downstream, separating them from the rest of the family group. This separation can increase mortality by increasing their susceptibility to predation, but there is no data available to indicate if this situation actually reduces waterfowl survival. This problem is primarily over by June 15th for geese and July 15th for ducks when juveniles mature to the point of being able to better deal with this disturbance.

Livestock Grazing

Portions of 5 allotments lie within the North Pole Ridge WSA. Table 4 summarizes existing livestock use in AUMs (animal unit months, the forage needed to sustain one cow and calf, or equivalent animals, for one month).

Existing livestock developments (among the man-made features listed in the Naturalness section) include 1.8 miles of fence and a reservoir. No new developments are proposed.

Some 2.9 miles of way in the WSA are used primarily for general livestock supervision and inspection and repair of existing livestock developments. Most of the everyday livestock work requires horses due to the lack of vehicular access.

Table 4. Existing Livestock Use, North Pole Ridge WSA (OR-5-8)

Grazing Allotment	Licensed AUMs in Allot.	Period of use	Percent of Allot. in WSA	Current Actual Use in WSA (AUMs)
Mauer (No. 2584)	526	03/01-02/28	6	30
Pine Creek (No. 2518)	346	04/16-11/17	58	199
Rattray (No. 2608)	163	08/15-02/28	9	15
Rattray (No. 2610)	29	10/25-02/28	90	26
Rattray (No. 2647)	64	04/10-02/28	100	64
Totals	1,128			334

Table 5. Economic Value and Local Personal Income Generated Annually, Existing Program, North Pole Ridge WSA (OR-5-8) (1981 price levels)

Livestock operators probably make less than 10 trips per year by vehicle into the WSA, solely for livestock management purposes.

Cultural Resources

Information about cultural resources in the WSA was collected from field surveys in the main John Day River Canyon in 1976. Human occupation of this region dates back between 4,500 and 7,000 years. Historically, the Tenino, a Columbia River culture, occupied the lower John Day River Canyon, among other areas. There have been 6 prehistoric sites identified within the WSA. These include 5 pithouse sites and a series of rock walls.

These sites are in excellent condition and have high research potential. They have not been greatly disturbed by artifact collectors.

Recreation Use

The North Pole Ridge WSA encompasses some of the most interesting and scenic portions of the John Day River Canyon. It is becoming more popular each year with floating recreationists. Current use is high during the three-month use season, with peaks during Memorial Day and Fourth of July holiday weekends.

Recreational activities requiring access by motor vehicle rather than by boat are limited in the WSA due to a lack of public access. Most deer, upland game, and waterfowl hunting is done by local landowners and their guests.

Economic Value and Local Income

Resource outputs which generate economic activity in this WSA include livestock grazing, recreation, and oil and gas leasing. As of January 1, 1984, there were no geothermal leases on the WSA.

Economic value and local personal income generated from existing levels of resource outputs are presented in table 5. The terms economic value and local personal income are discussed in the Statewide EIS volume.

Table 5. Economic Value and Local Personal Income Generated Annually, Existing Program, North Pole Ridge WSA (OR-5-8) (1981 price levels)

Resource Output	Unit of Measure	Quantity	Economic Value	Local Personal Income Generated
Grazing	AUM	334	$2,518	$3,293
Recreation (incl. hunting)	RVD	Unknown	Unknown	Unknown
Oil & gas leases	Acres	6,249	6,249	1,882
Total existing			8,767	5,175

Environmental Consequences

This section discusses the environmental consequences of implementing each of the alternatives. Resources and activities not significantly affected by any of the alternatives are not discussed. General impact conclusions applicable to all WSAs, including impact conclusions based on speculative future developments (developments which are possible, but not currently proposed), are discussed in the Statewide EIS volume. That volume also discusses certain assumptions that were made for this analysis.

Effects on Wilderness Values

The **all wilderness alternative** would add all 6,249 acres of public land in the North Pole Ridge WSA to the National Wilderness Preservation System (NWPS). This alternative would assure preservation of the outstanding wilderness characteristics found within and adjacent to this portion of the John Day River Canyon. The opportunity of floating or hiking through a major river canyon which is uncrowded and in near natural condition is uncommon in this region.

In addition, the outstanding scenic quality of the area would be preserved under this alternative. Wilderness designation would aid in preserving ecologically important riparian areas along the river, habitat for anadromous fish, two species of uncommon plants, relatively uncommon stands of climax bluebunch wheatgrass, and archeological sites.

Elimination of vehicle use on 2.9 miles of interior access ways would allow the ways to revegetate and restore the area to a more natural condition. It also would improve opportunities for solitude and primitive recreation.

The inholdings could be developed or used in ways which would impair wilderness values on surrounding public lands. However, there are no indications that such use would occur in the foreseeable future.

Under the **preferred alternative**, 5,990 acres would be added to the NWPS, assuming the 280 acres of private inholdings could be acquired. If the private land were acquired, there would be a corresponding increase in naturalness, opportunities for solitude and primitive recreation, and wilderness manageability, since the character of the private land is similar to the rest of the study area. All other impacts for the area recommended as suitable under this alternative would be the same as the all wilderness alternative.

The 539 acres that would be recommended nonsuitable for wilderness is located away from the river in the northern portion of the WSA. Excluding this area would have little adverse effect on wilderness values because naturalness and opportunities for solitude there are limited. A large portion of the area overlooks an existing road and gas pipeline in Pine Hollow, as well as a private ranch directly across the river in Thirtymile Canyon. Surface occupancy for oil and gas development would not be allowed in the canyon area, but the area would be open to mining.

The **partial alternative** would add 5,212 acres to the NWPS and preserve wilderness values on these 5,212 acres of public land within the viewable area along the John Day River. However, wilderness values in the nonsuitable area (1,037 acres) and on 80 acres of private inholdings within the suitable area could be adversely affected by potential land use activities, such as mining and exploration and development of oil and gas which have a moderate potential in this area. Areas with the most wilderness values in the nonsuitable portion of the WSA and, therefore, areas where wilderness values could be most affected by development of minerals or other resources, are parts of Big Gulch, Little Gulch and a small portion of Zig Zag canyon.

Under the **no wilderness/no action alternative,** naturalness, opportunities for solitude and primitive recreation, and special features within the WSA could be adversely affected by oil and gas exploration or development in portions of the WSA not protected by the no-surface-occupancy stiupulation. Wilderness values in any part of the WSA could be adversely affected by mining.

Effects on Energy and Mineral Development

Areas designated wilderness would be withdrawn from mineral exploration and development: 6,249 acres under the **all wilderness alternative**; 5,710 acres, plus an additional 280 acres of private land if acquired, under the **preferred alternative**; and 5,212 acres under the **partial alternative**.

Such withdrawals would include the areas rated moderate for oil and gas and metallic minerals, which encompass the entire WSA. The WSA has been leased with protective no-surface-occupancy stipulations within the viewable area of the John Day River Canyon.

No acreage would be withdrawn under the **no wilderness/no action alternative.**

Effects on Wildlife

Wildlife habitat would be preserved in areas designated wilderness.

Along the John Day River, grazing has depleted nesting sites for geese near the shoreline. The construction of 10 waterfowl nest structures placed in the tops of juniper trees or the construction of platforms on posts adjacent to the river would improve nesting availability and reproduction of Canada geese. This project might or might not be allowed under the **all, preferred and partial alternatives**, depending on a site-specific assessment of whether it would conform with Wilderness Management Policy. If it were not allowed, an opportunity to increase goose nesting and production would be foregone. The project would be implemented under the **no wilderness/no action alternative**, resulting in an increase in goose production.

Impacts by recreationists on waterfowl nesting would be minor since most recreational activity takes place on the river. The time spent on shore by recreationists is usually in areas unsuitable for nesting. The problem with boaters 'pushing' waterfowl downstream would continue under all alternatives.

Short term increases in visitor use projected under the all wilderness, preferred, and partial alternatives would increase the number of encounters of boaters and Canada geese broods along the river which would also increase harassment and separation of family groups.

In general, though, none of the alternatives would result in a significant impact to wildlife.

Effects on Livestock Grazing

The **all wilderness, preferred and partial alternatives** would have little effect on livestock grazing. Under the all wilderness alternative, 2.9 miles of ways would be closed and vehicle use for livestock management could be restricted, unless there were no practical alternative to vehicle use.

Because of the boundary adjustment under the preferred alternative, 2.4 miles of way would be closed while 0.5 mile of way would be part of the wilderness boundary and would remain open to vehicles. Under the partial alternative, 2 miles of way would be closed, leaving 0.9 mile of way open for vehicle use.

There would be no effect on livestock grazing under the **no wilderness/no action alternative**. Present grazing management and the use of motor vehicles would continue.

Effects on Recreation Use

Recreation use under the **all wilderness and preferred alternatives** would increase slightly in the years immediately after wilderness designation. This increase would be from recreationists who gain access to the area by boat and would be in addition to normal increases in visitor use that would occur regardless of whether the area was designated wilderness. If necessary to protect naturalness and solitude, as required by Wilderness Management Policy, visitor use levels could be regulated.

Under the **partial alternative**, recreation levels would be slightly higher than the all wilderness alternative because vehicle-oriented recreation on the canyon ridgetops (hunting by adjacent landowners and their guests) would be allowed to continue.

Under the **no wilderness/no action alternative**, river recreation is expected to continue to increase, as it has in the past. This increase would be from recreationists who gain access to the area by boat. Levels of vehicle-oriented recreation in the WSA are controlled by adjacent landowners. There are no public access routes into the area other than the river. For this reason, the amount of vehicle-oriented recreation in the WSA is expected to be the same under the partial and no wilderness/no action alternatives and remain constant in the future.

Short term river use levels would be slightly lower under the no wilderness/no action alternative than under the all wilderness alternative. Over a long period of time, however, the river recreation would be expected to continue to increase until crowding resulted in resource damage (primarily from camping). At this point, levels of use could be regulated.

However, the level at which regulation of such use could occur under this alternative would likely be a higher level than under the all wilderness, preferred, or partial alternatives. This is due to the fact that the "carrying capacity" of the canyon to accommodate camping use is greater than the "carrying capacity" of the canyon to accommodate more boats and people without appearing crowded and consequently no longer offering solitude or naturalness.

Effects on Economic Value and Local Income

The economic effects for the alternatives are presented in tables 6 and 7. Table 6 shows the effects on economic value and table 7, the effects on local personal income. It is not known at this time whether mineral development might occur, or whether the construction of the proposed goose nests would be allowed, if the area were designated wilderness. The column for each wilderness alternative shows the effects as a range of values dependent upon whether mineral development or goose nest construction were allowed.

Currently, there is little dependence on vehicles for livestock management in the study area. Any wilderness alternative would restrict such vehicle use unless there were no practical alternative. The maximum impact from road closures upon the grazing operator in the WSA would be an increase in cost of about $110 per year.

Table 6. Effects of Alternatives on Annual Economic Value, North Pole Ridge WSA (OR-5-8) (1981 price levels)

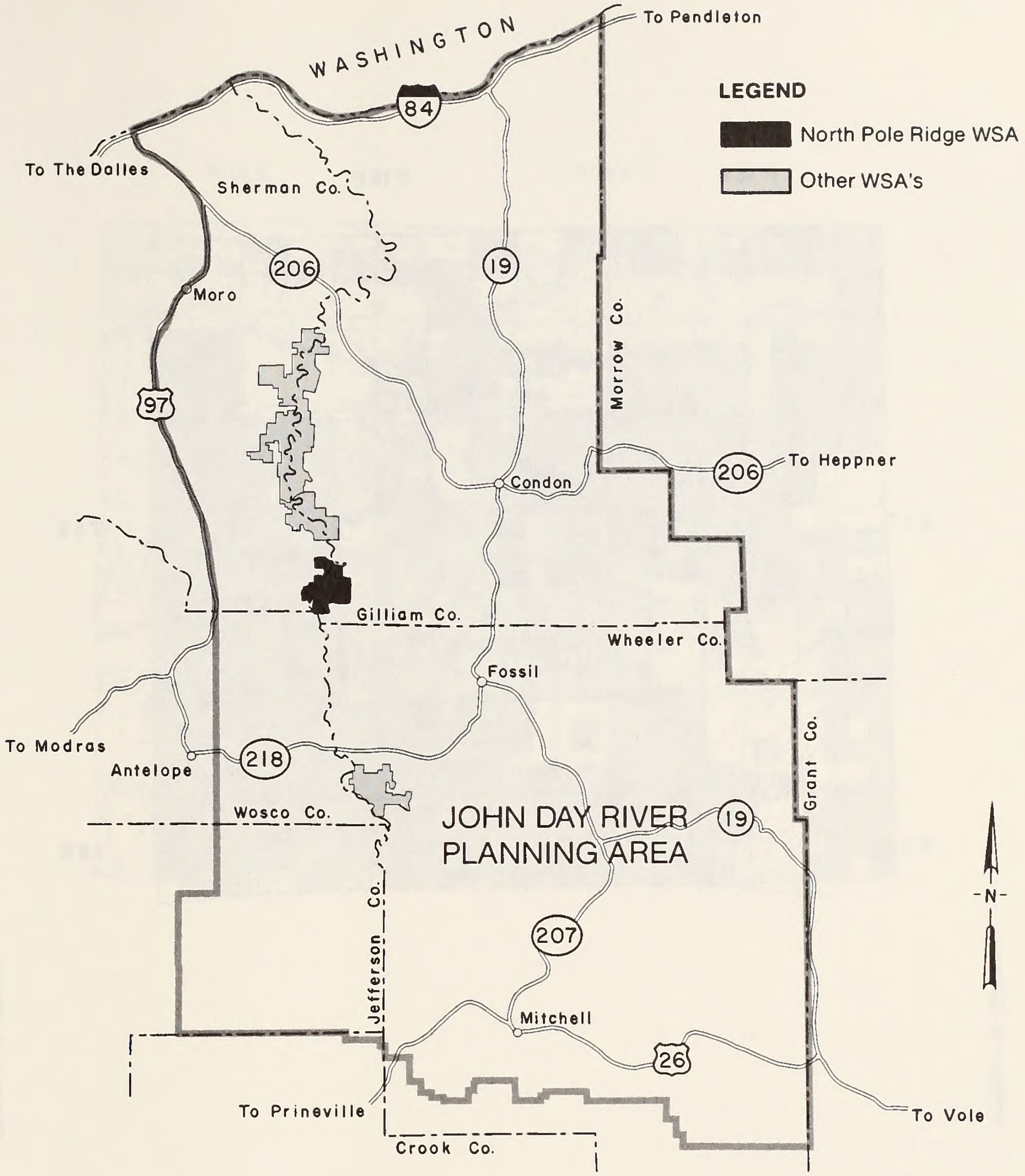
Item	Unit of Measure	All Wilderness	Preferred	Partial	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS					
Waterfowl hunting[1]	RVD	0 to +92	0 to +92	0 to +92	+92
Oil & gas leases	Acres	-6,249	-5,710	-5,212	0
VALUE OF PROPOSED INVESTMENTS[2]					
Waterfowl hunting	$	0 to +2,398	0 to +2,398	0 to +2,398	+2,398
Investments[3]	$	0 to -175	0 to -175	0 to -175	-175
Net economic value	$	0 to +2,223	0 to +2,223	0 to +2,223	+2,223
VALUE OF OTHER EXPECTED CHANGES IN OUTPUTS					
Oil and gas leases	$	-6,249	-5,710	-5,212	0
Reduced access[4]	$	-110	-110	-110	0
Total	$	-6,359	-5,820	-5,322	0
VALUE OF TOTAL EXPECTED CHANGES IN OUTPUTS					
All categories	$	-6,359 to -4,136	-5,820 to -3,597	-5,322 to -3,099	+2,223

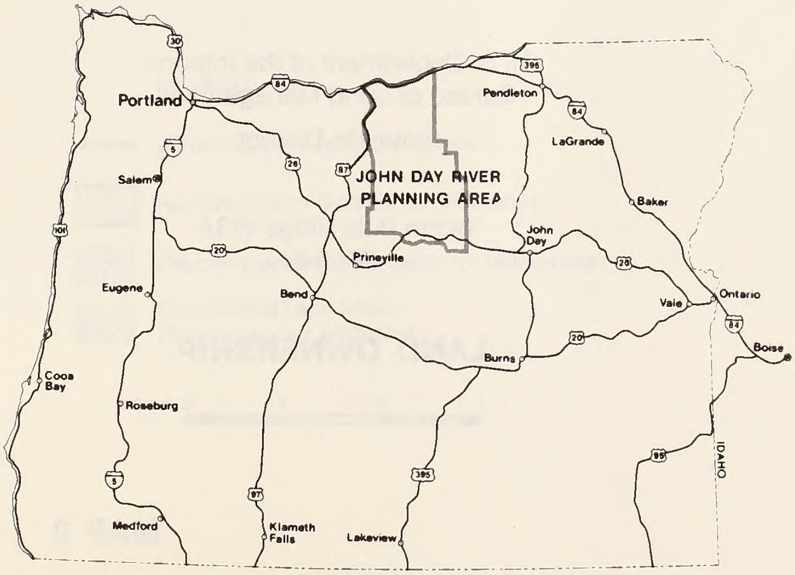
[1] Expected future increases from proposed structural wildlife project (goose nests).
[2] Structural project involving up to $5,920 total expenditures, including construction and maintenance.
[3] Average annual cost of investment expenditures amortized at 7.8% over 50-year period.
[4] Additional cost (shown as negative value) due to restriction of vehicular access for livestock operator.

Table 7. Effects of Alternatives on Local Personal Income, North Pole Ridge WSA (1981 price levels)

Item	Unit of Measure	All Wilderness	Preferred	Partial	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS					
Waterfowl hunting [1]	RVD	0 to +92	0 to +92	0 to +92	+92
Oil & gas leases	Acres	-6,249	-5,710	-5,212	0
INCOME FROM PROPOSED INVESTMENTS[2]					
Waterfowl hunting	$	0 to +676	0 to +676	0 to +676	+676
Construction activity[3]	$	0 to +201	0 to +201	0 to +201	+201
Total	$	0 to +676	0 to +676	0 to +676	+676
INCOME FROM OTHER EXPECTED OUTPUT CHANGES					
Oil and gas leases	$	-1,882	-1,720	-1,570	0
Total[4]	$	-1,882	-1,720	-1,570	0
INCOME FROM ALL OUTPUT CHANGES					
All categories	$	-1,882 to -1,206	-1,720 to -1,044	-1,570 to -894	+676

[1] Expected future increases from proposed structural wildlife project (goose nests).
[2] Structural project involving up to $5,920 total expenditures, including construction and maintenance.
[3] Local personal income generated annually during assumed 5-year construction period. This amount cannot be added to the income resulting from grazing and hunting activity because it is not sustained over the analysis period.
[4] Detail may not sum to "Total" due to rounding. Total omits income from construction which is limited to 5-year period. See footnote 3.





U. S. Department of the Interior
Bureau of Land Management

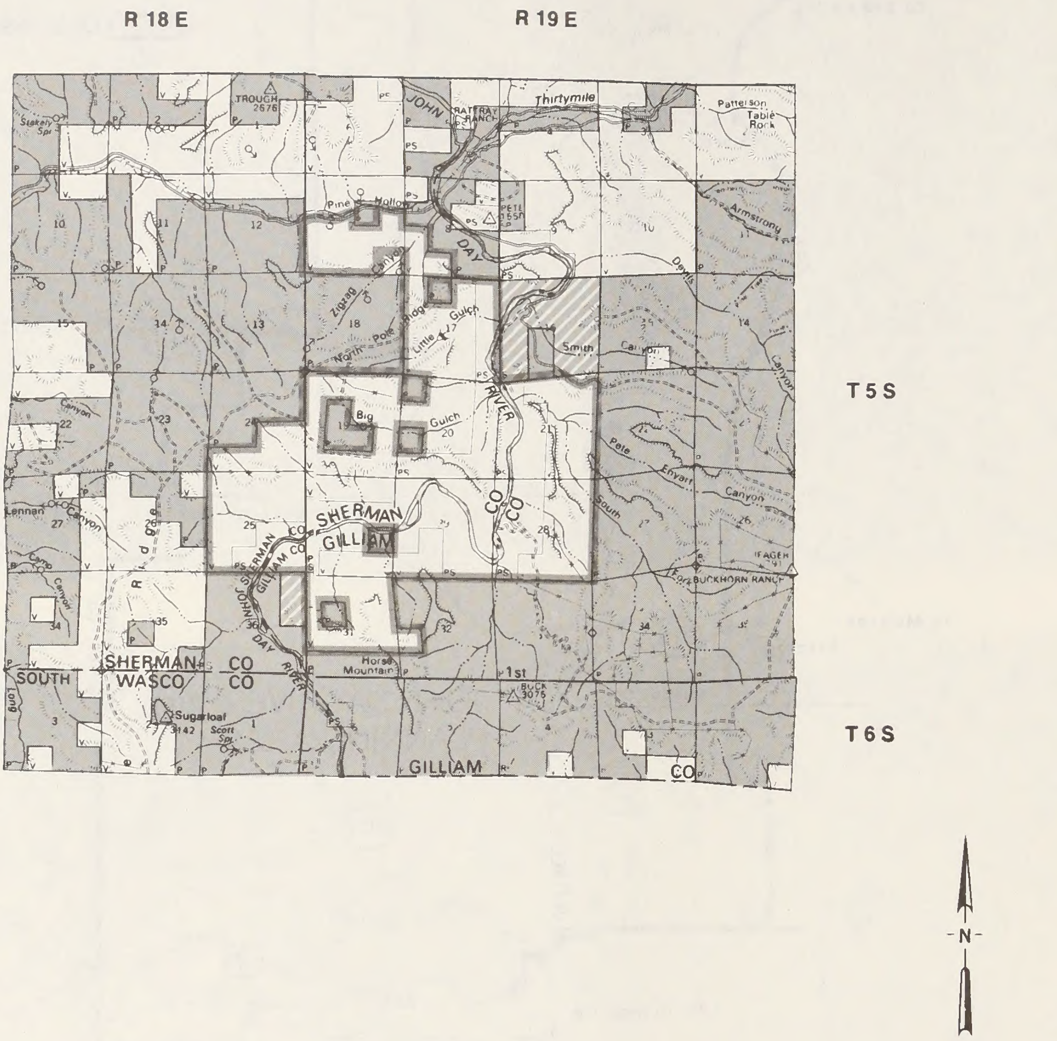
Prineville District

North Pole Ridge WSA
OR-5-8

LOCATION MAP

10 0 10 MILES

MAP 1



LEGEND

▬ Wilderness Study Area Boundary

□ Bureau of Land Management

▨ State

■ Private

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Prineville District

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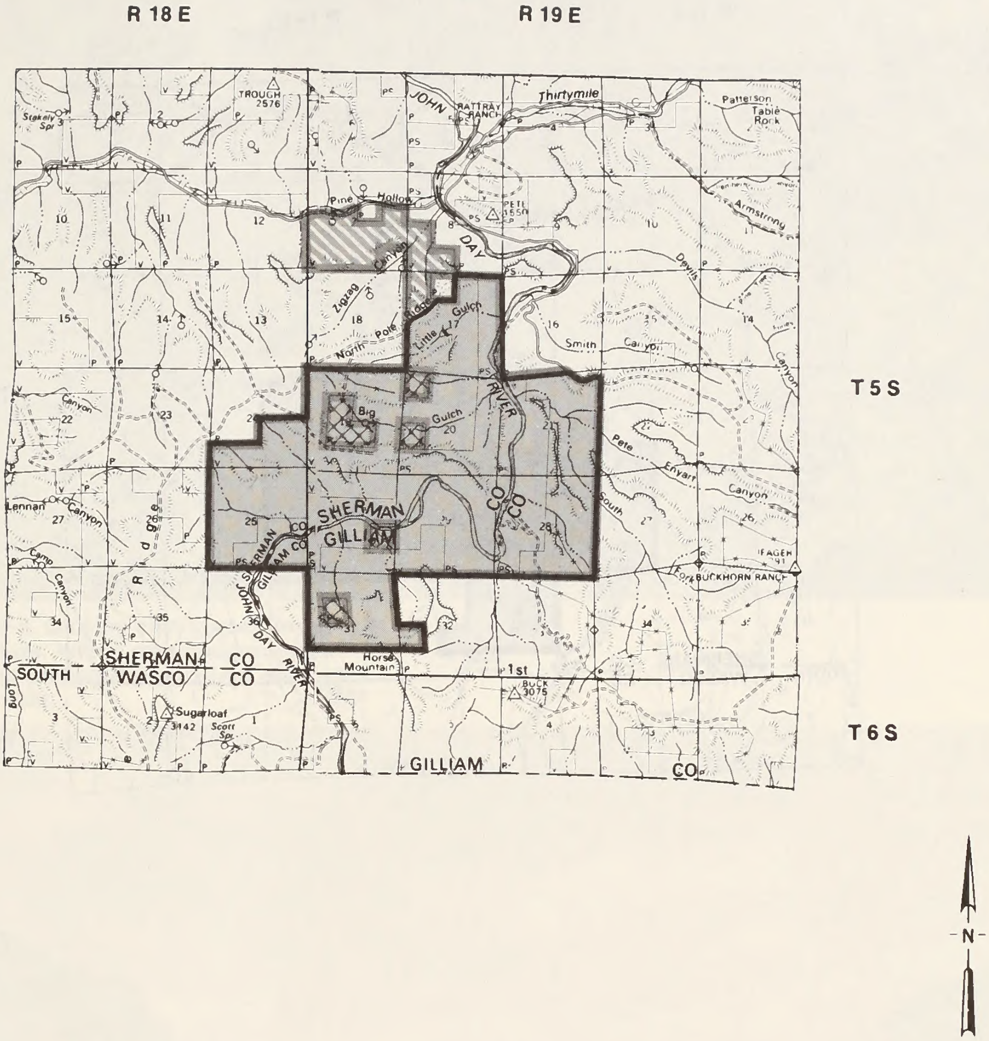
LAND OWNERSHIP

MAP 2



LEGEND

- ▬ Wilderness Study Area Boundary
- ■ Recommended Suitable for Wilderness
- ▨ Recommended Non-suitable for Wilderness
- ▦ Non-Federal Land within Recommended Wilderness

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North Pole Ridge WSA
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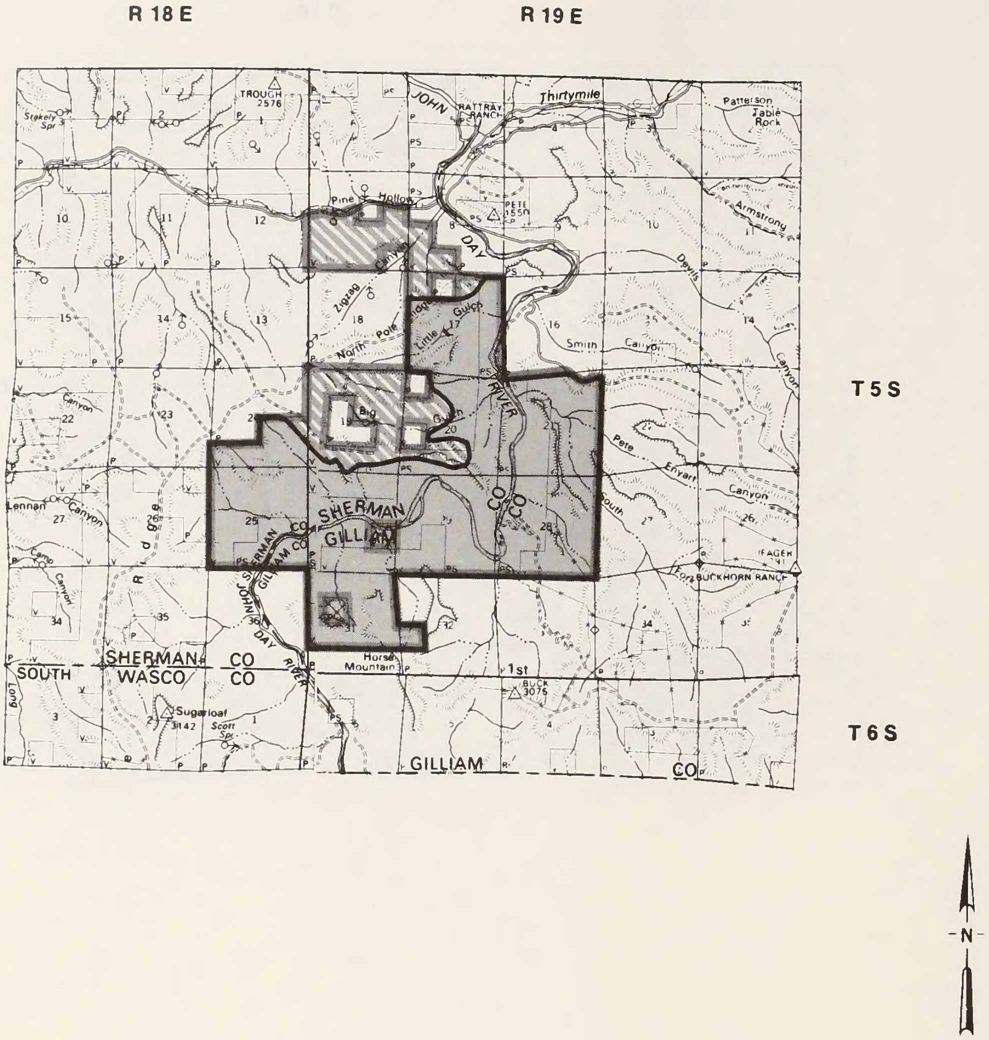
PREFERRED ALTERNATIVE

1 0 1 2 MILES

MAP 3



LEGEND

▬ Wilderness Study Area Boundary

▢ Recommended Suitable for Wilderness

▨ Recommended Non-suitable for Wilderness

▩ Non-Federal Land within Recommended Wilderness

U. S. Department of the Interior
Bureau of Land Management
Prineville District

North Pole Ridge WSA
OR-5-8

PARTIAL ALTERNATIVE

1 0 1 2 MILES

MAP 4

North Pole Ridge WSA, OR-5-8. Looking east toward Basalt Rapids from the John Day River. Within area recommended suitable under the partial and preferred alternatives. Typical scenery from the river. May 1981.

North Pole Ridge WSA, OR-5-8. Looking downstream (north) from river level toward Thirtymile Canyon. Within area recommended suitable under the partial and preferred alternatives. May 1981.

Appendix to the Wilderness Environmental Impact Statement for Oregon

Spring Basin Wilderness Study Area (OR-5-9)

General Description of WSA

Spring Basin wilderness study area (WSA) is located between 1/4 mile and 1 mile east of the John Day River as it meanders through the Clarno Valley in Wheeler County (see map 1). It is about 3 miles southeast of Clarno, Oregon and approximately 120 miles southeast of Portland. The northwest corner of the WSA is less than 1 1/2 miles from State Highway 218.

Spring Basin WSA is basically solid in shape with small extensions at three corners (see map 2). It is approximately 4 1/2 miles long north to south and 5 1/4 miles wide east to west. The western and southern boundaries of the WSA are a combination of county and private roads and adjacent private lands. The northern and eastern boundaries are formed by private land.

There are 5,982 acres of public land within the Spring Basin WSA, and one 40-acre private inholding located near the southwest boundary. The land surrounding the WSA is privately owned.

Spring Basin WSA has steep to rolling topography with sagebrush, western juniper, and bunchgrass-covered slopes. Near the river are basalt cliffs and escarpments. Three main drainages divide the study area, creating rugged side slopes. Horse Mountain and Black Rock offer views of portions of the WSA. There are also scenic vistas of the John Day River available from within the WSA.

The three drainages of the WSA flow toward the John Day River in a southerly and southwesterly direction. With the exception of a few isolated springs, no perennial water is found within the WSA.

Interrelationships

A 147-mile stretch of the John Day River, including the segment near the WSA, is an Oregon State Scenic Waterway, which provides some state control over private land use changes within a 1/2-mile wide river corridor adjacent to the WSA. In addition, the National Park Service has recommended this section of the river as a national wild and scenic river. No action has been taken on this recommendation.

A portion of the WSA near the John Day River is part of power site reserves and classifications which earmark the land for potential water power and water storage development. These "withdrawals" are scheduled for review in the next few years, which may lead to their revocation. Power site development is not foreseen, and therefore not discussed further. (See the Interrelationships section in the Statewide EIS volume.)

The entire WSA falls within lands which were ceded to the U.S. Government by the Warm Springs Indian Tribe by ratified treaty. This treaty reserved to the Indians rights for hunting, fishing and gathering in usual and accustomed places and grazing of livestock on unclaimed land.

Issues

Issues relating to each WSA were raised by BLM and the public during the wilderness inventory and EIS planning and scoping process. These issues concern both the effects of wilderness designation on existing and potential land uses or resources in the WSA, as well as the effects of existing and potential land uses on wilderness values. Land uses or resources raised as issues specifically for this WSA include:

- future range improvement projects in the WSA,
- use of vehicles for recreation and livestock management, and
- existing oil and gas leases in the WSA and future exploration and development.

Description of the Alternatives

The following alternatives are analyzed:

- all wilderness
- partial
- no wilderness/no action (preferred alternative)

An enhanced wilderness alternative is not analyzed because there is no feasible opportunity to significantly enhance wilderness values through road closures, acquisition of private inholdings, or addition of other tracts of public land.

All Wilderness

Under the all wilderness alternative, all 5,982 acres of public land in the Spring Basin WSA would be recommended suitable as wilderness (see map 2). For purposes of analysis, it is assumed the 40-acre private inholding would not be acquired.

Partial

Under the partial alternative, 5,299 acres of public land in the WSA would be recommended suitable as wilderness and 683 acres would be recommended as nonsuitable (see map 3). The area recommended suitable would include the 40-acre private inholding. For purposes of analysis, it is assumed this parcel would not be acquired.

Opportunities for solitude within the 453 acres recommended as nonsuitable along the western boundary of the WSA are substantially reduced by the outside sights and sounds of vehicle travel on the adjacent county road and farming activities.

The two small areas totaling 230 acres in the northeast portion of the WSA recommended as nonsuitable both lack special features and have limited opportunities for solitude or primitive recreation due to their location, small size and shape.

The boundary between the suitable and nonsuitable areas would be a prominent canyon rim along the western boundary and the surveyed section line which approximately separates drainages in the northeast part of the WSA.

No Wilderness/No Action (Preferred Alternative)

The no wilderness/no action alternative would recommend the entire WSA nonsuitable as wilderness. It represents the situation most likely to occur without wilderness designation. The area would be managed according to the current land use plan, which includes the following features relevant to this analysis:

- continued availability for oil and gas and other mineral exploration and development, and
- continued use of motorized vehicles.

Table 1 summarizes the proposed management of the WSA under each alternative.

Table 1. Summary of Proposed Management Under Each Alternative, Spring WSA (OR-5-9)

Proposed Management	All Wilderness	Partial	No Wilderness/ No Action
Acres Designated as Wilderness	5,982	5,299	0
Acres Closed to ORVs by Wilderness Designation	5,982	5,299	0
Miles of Ways Closed	9.0	8.2	0
Acres Withdrawn from Mineral Location and Leasing by Wilderness Designation	5,982	5,299	0

Table 2 summarizes the environmental consequences of each alternative.

Manageability of the Area as Wilderness

The entire Spring Basin WSA would be manageable as wilderness. The 40-acre inholding of private land does not affect the area's manageability, since it is used for livestock grazing. No changes in the use of the land are expected.

The existence of 3 mining claims in the middle of the WSA could adversely affect manageability of the area in the future. There are no indications of mineral development on the claims and their potential is unknown. However, if the claims were

Table 2. Summary of Environmental Consequences of Alternatives, Spring Basin WSA (OR-5-9)

Resource or Activity	All Wilderness	Partial	No Wilderness/No Action (Preferred Alternative)
Wilderness Values	Would add 5,982 acres to NWPS and preserve wilderness values in entire WSA, including those in Spring Basin, Horse Mountain, Black Rock, and the rugged escarpments and drainages. Aid in preservation of bald eagle winter habitat and plants of special interest. Nine miles of ways would be closed to vehicle travel which would enhance naturalness and opportunities for solitude and primitive and unconfined types of recreation. If private inholdings or mining claims with valid rights were developed, wilderness values would be impaired. The entire WSA would be manageable as wilderness.	Would add 5,299 acres to the NWPS, and preserve wilderness characteristics in suitable area. On the portion recommended as nonsuitable, adverse effects would be similar to those of the no wilderness/no action alternative. The portion recommended as suitable would be manageable as wilderness. If private inholdings or mining claims with valid rights were developed, wilderness values would be impaired. Closure of 8.2 miles of way would enhance naturalness and opportunities for solitude and primitive recreation.	Wilderness characteristics would be adversely affected by vehicle-oriented recreation use on nine miles of ways. Possible mining and oil and gas development could also adversely affect naturalness, solitude, opportunities for primitive recreation and special features.
Energy and Mineral Development	Development precluded on 5,982 acres, including 5,982 acres with moderate potential for oil and gas; 2,315 acres with moderate potential for metallic minerals; and 500 acres with moderate potential for semi-precious minerals.	Development precluded on 5,299 acres, including 5,299 acres with moderate potential for oil and gas; 2,165 acres with moderate potential for metallic minerals; and 380 acres with moderate potential for semi-precious minerals.	No impact.
Livestock Grazing	No effect on existing forage allocation. Use of vehicles for livestock management could be restricted on 9 miles of ways.	Same as all wilderness except possible vehicle use restrictions would apply to 8.2 miles of ways.	No impact.
Recreation Use	Elimination of a moderate amount of vehicle-oriented recreation use by hunters and others would be somewhat offset by an increase in primitive recreation, with a substantial reduction in overall use. This reduced use would not be displaced to other nearby areas. Opportunities for primitive recreation would increase.	Vehicle-oriented recreation use allowed on .8 miles of ways. Majority of nonsuitable area is too steep and rugged for vehicular travel. Effects on overall use would be same as all wilderness.	Vehicle-oriented recreation would reduce opportunities for primitive recreation. Vehicle-oriented recreation use levels would continue to increase as in the past. Overall levels of recreation use would be the highest under this alternative.
Economic Value and Local Income	Decrease in economic value and local personal income by $6,029 and $1,801, respectively, from loss of oil and gas leases. The maximum increase in transportation costs would be $47.	Decrease in economic value and local personal income by $5,346 and $1,596, respectively, from loss of oil and gas leases. The maximum increase in transportation costs to livestock operators would be $47.	No impact.

determined to be valid (a valuable mineral deposit would have to be discovered before the area was designated wilderness) and were developed, the WSA would be difficult to manage as wilderness.

Rationale for Selection of the Preferred Alternative

The no wilderness/no action alternative is preferred because the benefits of retaining options for development of mineral resources and leaving the area open to vehicle use by livestock operators and hunters outweigh the benefits of preserving the area's wilderness values.

The naturalness of the WSA is limited by the many intrusions in the area, including fences, ways (vehicle routes established and maintained solely by the passage of vehicles) used by hunters and ranchers for many years, and a woodpole utility powerline.

Due to the small size of the WSA, opportunities for solitude are outstanding only in two areas within this WSA. Outside sights and sounds, particularly from the western boundary road, nearby farming operations, and the Rajneeshpuram NeoSannyas International Commune further reduce opportunities for solitude in the western portion of the WSA. Although there are outstanding opportunities for day hiking, sightseeing, photography, and botanical studies, opportunities for most primitive or unconfined types of recreation are less than outstanding. There are excellent opportunities for vehicle-oriented recreation use, particularly hunting. This WSA is the only large, accessible tract of public land in this locale which is available for vehicle-oriented recreation.

Also, the entire WSA has been classified as having a moderate potential for oil and gas. A portion of the WSA also has moderate potential for semiprecious stones.

Affected Environment

This section discusses only those activities or resources that influence the character of the study area, or that may be affected by the alternative.

Wilderness Values

Naturalness

Although the Spring Basin WSA is generally in a natural condition, there are many man-made features scattered throughout a large portion of the WSA. These features include 3.1 miles of fence, 2 spring developments, and 9 miles of ways. The cumulative effect of these man-made features influences 38 percent of the WSA. (The area of influence is an estimate of the acreage within the WSA from which these features can be seen.) This is significant due to the relatively small size of the area. Although these features do not affect the area to the point that it no longer appears natural, the overall natural condition of this WSA is limited, especially when the ways and other intrusions are viewed and encountered while hiking cross country.

Opportunities for Solitude or Primitive and Unconfined Types of Recreation

The Spring Basin WSA contains two areas where outstanding opportunities for solitude are available. These two areas are located within the upper reaches of Hay Bottom Canyon and between Eagle Canyon and Breo Flat where natural screening allows a visitor to find a secluded spot. There are also a few areas in the canyons where secluded spots are available, but these locations are very small and are on steep canyon slopes.

Opportunities for solitude in a portion of the WSA between the western boundary road and the prominent canyon rim above this road are marginal due to outside sights and sounds of vehicle traffic, farming, and building activities on adjacent lands.

Rajneeshpuram is located 1/4 mile southwest of the study area. A high degree of development has occurred in this area, and intense agricultural production activities will likely continue to occur in the future. Sounds from the commune adversely affect opportunities for solitude in the 453-acre area between the western boundary and the canyon rim. The sight and sounds of the commune are also evident on the ridgelines of Spring Basin, the ridgeline north of Horse Mountain, and other high elevations in the WSA.

A variety of primitive, unconfined recreational activities are available in the WSA. Opportunities for day hiking, sightseeing, botanical study and photography of geologic formations are outstanding. Due to the rugged topography of the WSA, most of these recreation activities are confined to the canyon bottoms.

Special Features

A portion of the Clarno formation is in Eagle Canyon in the WSA and the rugged shape and colorful clay soils enhance the scenic quality and diversity within the WSA. The WSA is also part of a winter habitat area for the northern bald eagle, which is federally listed as threatened in Oregon.

One plant species of special interest has been found within the WSA; two others are suspected to occur in the WSA. (These plants are further discussed in the Vegetation section.)

Diversity in the National Wilderness Preservation System (NWPS)

According to the Bailey/Küchler method of classifying ecosystems, the Spring Basin WSA is located within the Palouse Grassland Province and the potential natural vegetation is wheatgrass/bluegrass and sagebrush steppe with juniper. Of the vegetative communities listed in the High Lava Plains and Columbia Basin section of the Oregon Natural Heritage Plan, the WSA contains the western juniper/big sagebrush/blue bunch wheatgrass, big sagebrush/bluebunch wheatgrass, and bluebunch wheatgrass/Sandberg's bluegrass communities.

There are several standard metropolitan statistical areas with population over 100,000 within 5 hours' driving time of the Spring Basin WSA: Eugene/Springfield, Portland and Salem, Oregon; and Richland/Kennewick/Pasco and Yakima, Washington.

Energy and Mineral Development

Energy and mineral resources were evaluated from available geologic data supplemented by a limited amount of geochemical rock chip sampling. Technical details of the findings of the evaluation are found in a BLM report and file titled "Assessment of Geology, Energy, and Minerals (GEM) Resources, Spring Basin WSA." The WSA has been classified according to a rating system that indicates both the potential for occurrence (geologic favorability) of certain minerals, as well as the quantity and quality of data on which the rating is based (confidence level). A description of the rating system is provided in the Statewide EIS volume.

Stream sediment and rock chip samples indicate moderate potential for mercury, zinc, lithium, and molybdenum on a portion of the WSA. Zinc, mercury, and molybdenum are strategic and critical minerals; but there are no known deposits of these metals in the study area.

As of January 1, 1984, there were 3 mining claims (covering 60 acres) for semiprecious minerals in the WSA, indicating a moderate potential for this commodity in a portion of the study area.

Oil and gas has a moderate potential based on several factors. Several oil and gas exploration wells have been drilled south of the WSA with one of the wells recovering gas. In the same area there are three reported asphalt occurrences. Further north, near Condon, a deep well had a slight oil show. The combination of surface and subsurface hydrocarbon shows, surface and subsurface geology, and current oil and gas leasing all lead to a moderate potential for oil and gas in the entire WSA.

As of January 1, 1984, the entire WSA was covered by oil and gas leases.

Table 3 shows the mineral potential classifications for the WSA. Map 4 shows the portions rated moderate (medium) for metals and semiprecious minerals.

The exposed rocks in the WSA are Tertiary volcanic flows and volcaniclastic sediments of the Clarno formation. The subsurface rocks are inferred from oil and gas exploration wells to include Cretaceous marine clastic sediments and pre-Cretaceous marine sediments and metamorphosed sediments.

Vegetation

Vegetation in the Spring Basin WSA consists primarily of big sagebrush with varying amounts of western juniper. Grasses include bluebunch wheatgrass, Idaho fescue, Sandberg's bluegrass, needlegrass, and dropseed, and cheatgrass. Snakeweed, bitterbrush, lupine, locoweed and mountain mahogany are also plants common to the WSA.

Table 3. Classification of Energy and Mineral Potential, Spring Basin WSA (OR-5-9)

Commodity	Area	Classification Level	Confidence Level
Metals (zinc, mercury, lithium, molybdenum)	See map 4	3	C
Diatomite	Entire WSA	2	C
Limestone	Entire WSA	2	C
Zeolites	Entire WSA	2	C
Bentonite	Entire WSA	2	C
Semiprecious minerals	See map 4	3	C
	Rest of WSA	2	B
Uranium/Thorium	Entire WSA	1	B
Geothermal	Entire WSA	1	C
Oil/Gas	Entire WSA	3	C
Sodium/Potassium	Entire WSA	2	B
Coal	Entire WSA	1	B
Tar Sands/Oil Shale	Entire WSA	1	B
Sand/Gravel	Entire WSA	2	C
Crushable Rock	Entire WSA	2	C

Legend:
Class 1 - Lack of indications of favorability
Class 2 - Low favorability
Class 3 - Moderate favorability
Class 4 - High favorability

Confidence Level A - Insufficient data or no direct evidence
Confidence Level B - Indirect evidence available
Confidence Level C - Direct evidence but quantitatively minimal
Confidence Level D - Abundant direct and indirect evidence

The potential climax vegetation of the WSA is primarily bluebunch wheatgrass, including lesser amounts of big sagebrush, bluegrass, and bitterbrush.

Vegetation in the WSA varies from early seral to late seral, with few scattered climax sites. (Seral refers to the stage of ecological condition based on the difference between the present plant community and climax vegetation, the relatively stable, final stage in plant succession.) Much of the WSA is in early seral stage due to a long history of overgrazing by cattle, sheep and horses. The vegetation consists of invader species such as snakeweed, cheatgrass and sagebrush, along with foxtail and annual fescue. This vegetation is typical in the drainages and on the gentler slopes where livestock have had easy access.

Farther upslope, and in areas well away from water, the vegetation consists of a greater amount of climax species such as bluebunch wheatgrass and bitterbrush. Some steep north exposures consist almost entirely of bunchgrass, often Idaho fescue.

There are three plant species of special interest (mentioned in the Special Features section) existing or thought to occur in this WSA: *Castilleja xanthatricha* (yellow hairy Indian paintbrush) is a candidate species for Federal listing as threatened or endangered and is known to exist in the WSA. *Collomia macrocalyx* (bristle-flowered collomia) and *Astragulus diaphanus* (John Day milkvetch) are also Federal candidate species and are suspected to occur in the WSA.

Wildlife

Game animals in the WSA include mule deer, chukar, and California quail. Several species of small mammals and nongame birds are also inhabitants of the WSA.

No crucial deer winter range or critical habitats have been identified in the study area. The northern bald eagle, which is federally listed as threatened in Oregon, is an occasional winter resident in the study area.

Livestock Grazing

Portions of 5 grazing allotments lie within the Spring Basin WSA. Table 4 summarizes existing livestock use in AUMs (animal unit months, the amount of forage needed to sustain one cow and a calf, or equivalent animals, for one month).

Existing livestock developments (among the man-made features mentioned in the Naturalness section) are the 3.1 miles of fence and 2 spring developments. No new developments are proposed.

The 9 miles of ways in the WSA are used primarily

Table 4. Existing Livestock Use, Spring Basin WSA (OR-5-9)

Grazing Allotment	Licensed AUMs in Allot.	Period of Use	Percent of Allot. in WSA (AUMs)	Current Actual Use in WSA (AUMs)
Hayfield (No. 2535)	11	10/01-12/21	27	3
Dry Knob (No. 2656)	7	04/01-10/31	100	7
Rim (No. 2649)	3	05/01-07/31	33	1
Rolfe (No. 2615)	4	08/10-10/09	25	1
Spring Basin (No. 2536)	142	04/01-11/14	42	60
Total	167			72

for general livestock supervision and for inspection and repair of existing livestock developments. The livestock operators make between 15 and 20 trips per year with vehicles into the WSA.

Recreation Use

The Spring Basin WSA is a popular area visited by recreationists using motor vehicles. These users are primarily hunters and local ranchers. Students and teachers from nearby Camp Hancock and occasionally botanists, paleontologists, and rockhounds also either drive or hike through the area.

Primitive recreation use is not high, due to the remoteness and lack of widespread public knowledge of the area. The level of deer hunting in the WSA is moderate and is thought to be gradually increasing. Vehicle access is generally confined to the ways in the WSA, but some cross-country ORV use occurs in portions of the canyon areas.

Economic Value and Local Income

Resource outputs which generate economic activity in this WSA include livestock grazing, recreation, and oil and gas leasing. As of January 1, 1984, there were no geothermal leases on the WSA.

Economic value and local personal income generated from existing levels of resource outputs are presented in table 5. The terms economic value and local personal income are discussed in the Statewide EIS volume.

Table 5. Economic Value and Local Personal Income Generated Annually, Existing Program, Spring Basin WSA (OR-5-9) (1981 price levels)

Resource Output	Unit of Measure	Quantity	Economic Value	Local Personal Income Generated
Grazing	AUM	72	$543	$710
Recreation (incl. hunting)	RVD	Unknown	Unknown	Unknown
Oil & gas leases	Acres	5,982	5,982	1,801
Total			6,525	2,511

Environmental Consequences

This section discusses the environmental consequences of implementing each of the three alternatives. Resources and environmental factors not significantly affected by any of the alternatives are not discussed. General impact conclusions applicable to all WSAs, including impact conclusions based on speculative future developments (developments which are possible, but are not currently proposed), are discussed in the Statewide EIS volume. That volume also discusses certain assumptions that were made for this analysis.

Effects on Wilderness Values

The **all wilderness alternative** would add all 5,982 acres of the Spring Basin WSA to the National Wilderness Preservation System (NWPS). It would preserve wilderness values in Spring Basin, Horse Mountain, Black Rock, and the rugged escarpments and drainages. Wilderness management would aid in the preservation of bald eagle winter habitat and plants of special interest.

If the private inholding were developed, wilderness values could be impaired. However, there are no known plans for development of the land. If a valuable mineral deposit were discovered on the mining claims before the area was designated wilderness, they could be developed in a manner which impaired wilderness values. The claims are near the center of the WSA, so developments on them would be visible to persons hiking through the area.

The elimination of vehicle use on 9 miles of ways would allow revegetation, resulting in a more natural condition. Solitude and primitive and unconfined types of recreation would also be enhanced due to the elimination of motor vehicles in the WSA.

The **partial alternative** would add 5,299 acres to the NWPS. Some 453 acres in the western portion of the WSA and 230 acres in the northeast portion would be recommended as nonsuitable for wilderness.

In the portion recommended as suitable for wilderness, the effects on wilderness values would be similar to those of the all wilderness alternative. Closure of 8.2 miles of ways would increase the naturalness of the area and enhance opportunities for solitude and primitive recreation.

If oil and gas or other minerals were developed in the portions recommended as nonsuitable for wilderness, wilderness values would be adversely affected. The continued use of vehicles in those portions of the WSA would prevent the area from returning to a more natural condition and would continue to adversely affect opportunities for solitude and primitive recreation.

Under the **no wilderness/no action alternative** (and in the portions recommended nonsuitable under the partial alternative), any mineral development could adversely affect wilderness values, including the area's special wilderness features and opportunities for solitude and primitive recreation. Some adverse effects from oil and gas or geothermal lease development could be mitigated through lease stipulations.

Also, under the no wilderness/no action alternative, naturalness, opportunities for solitude and primitive, unconfined types of recreation and special features would be adversely affected to a moderate degree by vehicle-oriented recreation if no other protective restrictions on ORV use were implemented.

Effects on Energy and Mineral Development

Areas designated wilderness would be withdrawn from mineral exploration and development. Total acres withdrawn under each alternative as well as the portions rated moderate for certain minerals in the WSA are shown in table 6.

Effects on Livestock Grazing

The **all wilderness alternative** could have a moderate adverse effect on livestock grazing by restricting vehicular access. Nine miles of way would be closed which may restrict or eliminate the use of vehicles by ranchers. However, ranchers could continue to use vehicles if there were no practical alternatives. Livestock use would not be affected.

Table 6. Effects of Alternatives on Energy and Mineral Development, Spring Basin WSA (OR-5-9)

	Acres Withdrawn		
	All Wilderness	Partial	No Wilderness/ No Action
Total acres	5,982	5,299	0
Oil and gas rated moderate	5,982	5,299	0
Metals rated moderate	2,315	2,165	0
Semiprecious minerals rated moderate	500	380	0

Effects of the **partial alternative** in the area recommended suitable would be the same as for all wilderness alternative. Approximately 8.2 miles of way would be closed and 0.8 miles would remain open.

There would be no effect on livestock grazing under the **no wilderness/no action alternative**, and in the portion recommended nonsuitable under the partial alternative. Grazing management and the use of motor vehicles under the no wilderness/no action alternative would continue.

Effects on Recreation Use

Under the **all wilderness alternative**, vehicle-oriented recreation in the wilderness area would be eliminated, and primitive recreation would be expected to increase slightly. The net impact of this alternative would be a substantial reduction in overall levels of recreation use. This reduction in recreation use is not expected to be displaced into other areas nearby, due to the lack of legally accessible public lands in the vicinity of the Lower John Day River.

Under the **partial alternative**, opportunities for primitive recreation would be enhanced in the area recommended suitable. Vehicle use would be prohibited on 5,299 acres of public land. This alternative would allow vehicle use in the area recommended nonsuitable, but it probably would be restricted to a short vehicle way in the western portion because of steep, rugged terrain. The effect of this alternative would essentially be the same as the all wilderness alternative.

Under the **no wilderness/no action alternative** levels of recreation use would continue to increase as they have in the past. Increased vehicle-oriented recreation activities in the WSA would reduce primitive recreation opportunities. There would be no impact to vehicle-oriented recreation under this alternative. Overall levels of recreation use would be the highest under this alternative.

Effects on Economic Value and Local Income

The economic effects for the alternatives are presented in tables 7 and 8. Table 7 shows the effects on economic value and table 8, the effects on local personal income. It is not known at this time whether oil and gas operations would be conducted if the area were designated wilderness.

No investments are proposed.

Currently, there is little dependence on vehicles for livestock management in the study area. The all wilderness alternative would restrict such vehicle use unless there were no practical alternative. The maximum impact from road closures upon the grazing operator in the WSA would be an increase in cost of about $47 per year.

Table 7. Effects of Alternatives on Annual Economic Value, Spring Basin WSA (OR-5-9) (1981 price levels)

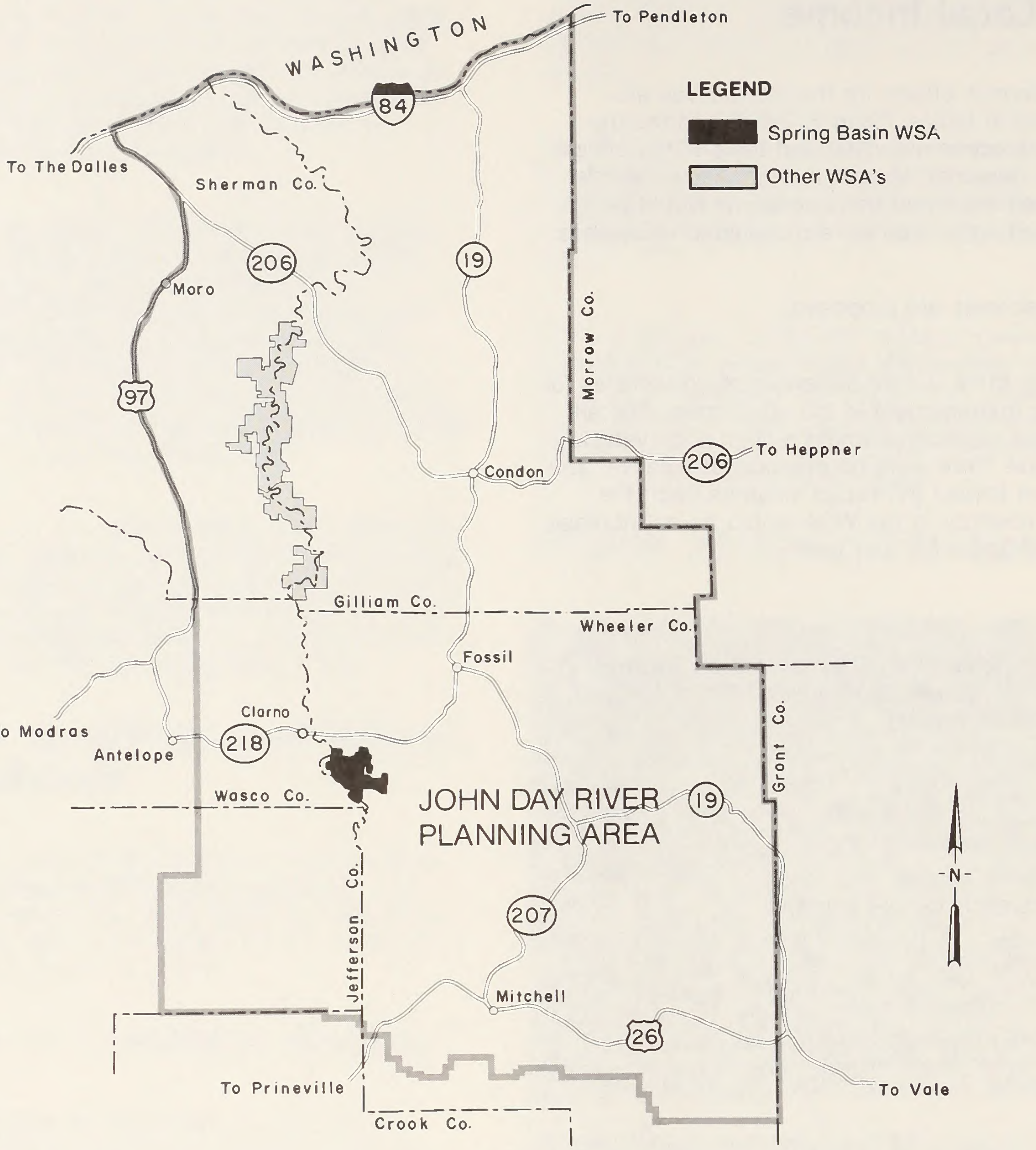
Item	Unit of Measure	Wilderness	All Partial	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS				
Oil & gas leases	Acres	-5,982	-5,299	0
VALUE OF EXPECTED CHANGES IN OUTPUTS				
Oil & gas leases	$	-5,982	-5,299	0
Reduced access[1]	$	-47	-47	0
Total	$	-6,029	-5,346	0

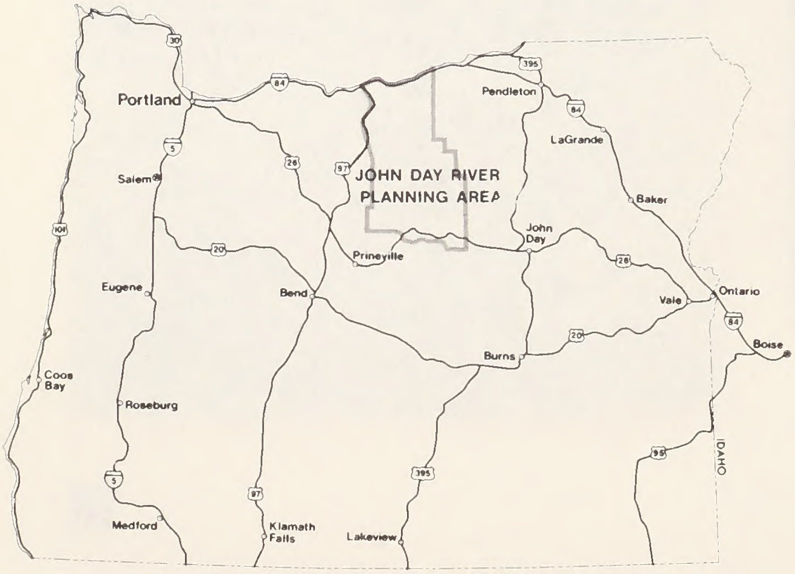
[1] Additional cost (shown as negative value) due to restriction of vehicular access for livestock operator.

Table 8. Effects of Alternatives on Local Personal Income, Spring Basin WSA (OR-5-9) (1981 price levels)

Item	Unit of Measure	All Wilderness	Partial	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS				
Oil & gas leases	Acres	-5,982	-5,299	0
INCOME FROM EXPECTED OUTPUT CHANGES				
Oil & gas leases	$	-1,801	-1,596	0
Total[1]	$	-1,801	-1,596	0

[1] Detail may not sum to "Total" due to rounding.





U. S. Department of the Interior
Bureau of Land Management

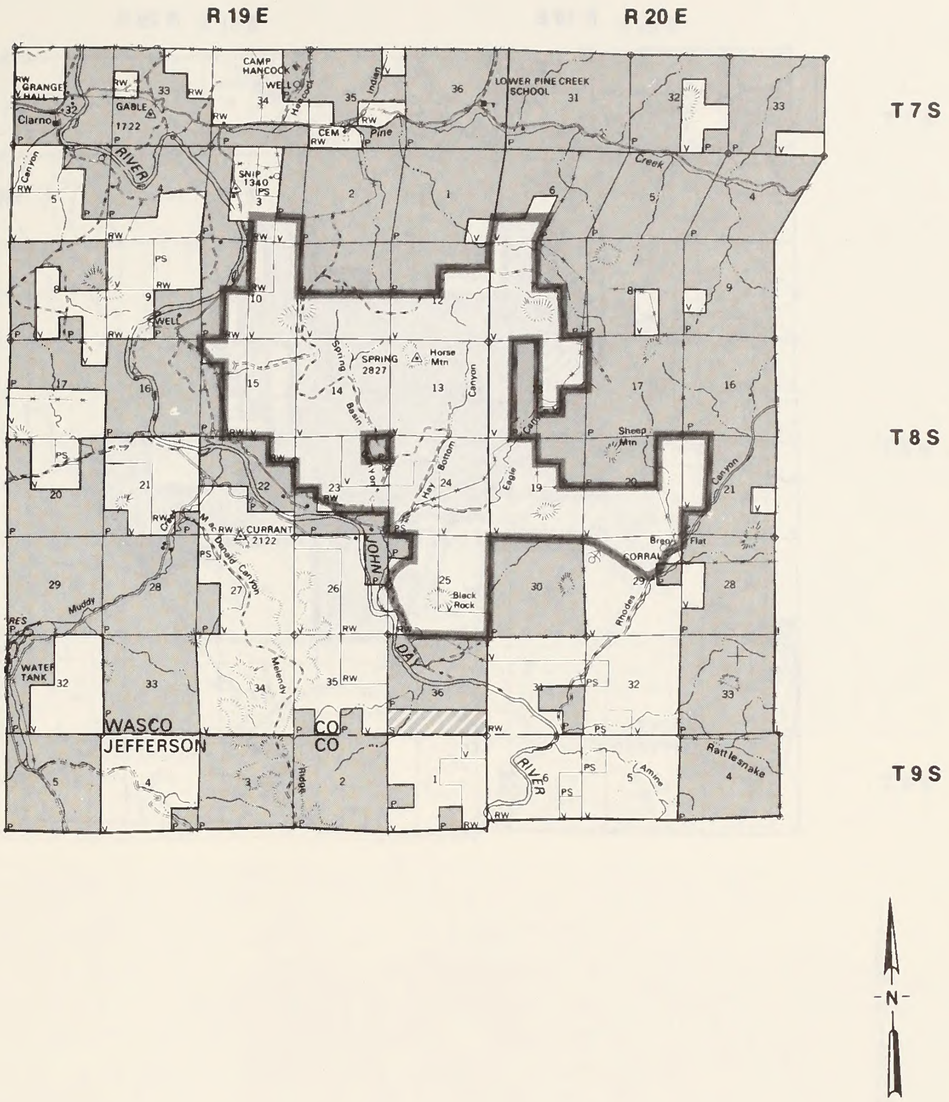
Prineville District

Spring Basin WSA
OR-5-9

LOCATION MAP

10 0 10 MILES

MAP 1



LEGEND

▬ Wilderness Study Area Boundary

☐ Bureau of Land Management

▨ State

■ Private

U. S. Department of the Interior
Bureau of Land Management

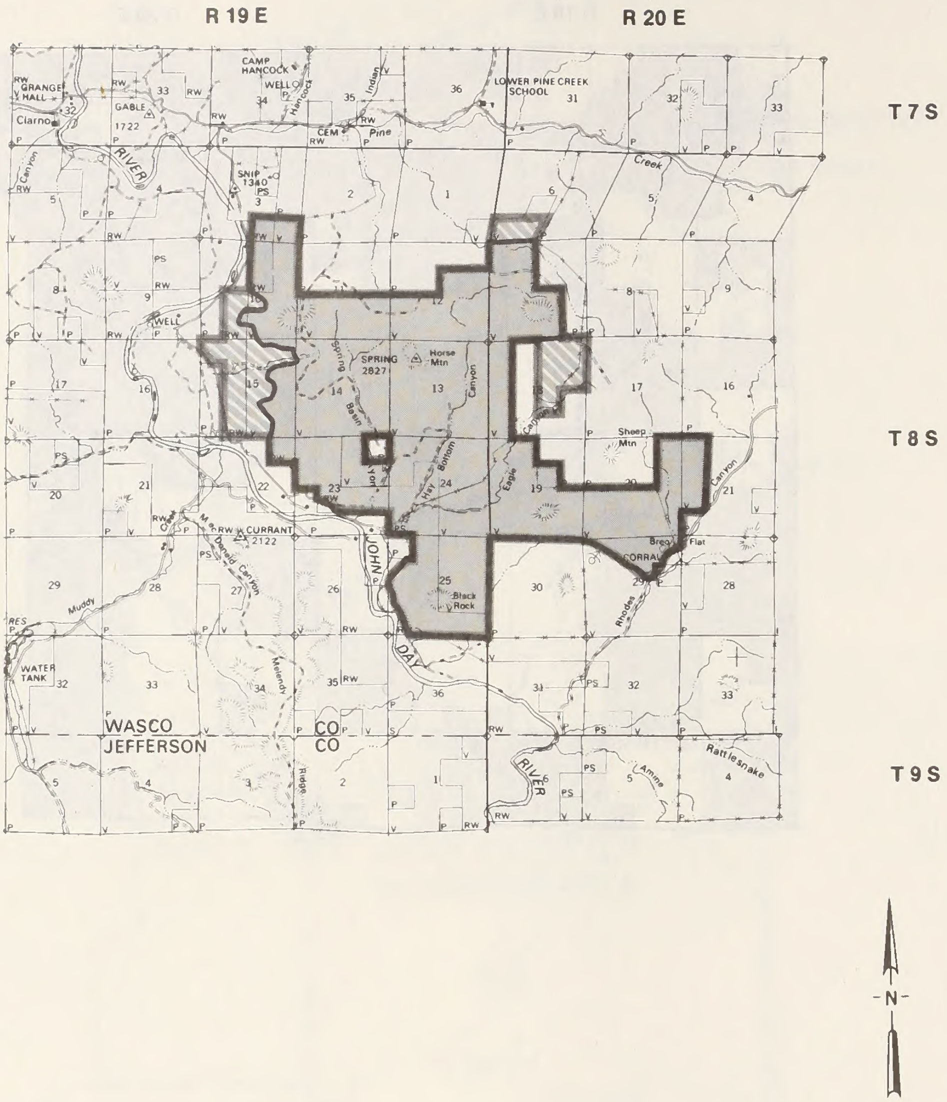
Prineville District

Spring Basin WSA
OR-5-9

LAND OWNERSHIP

1 0 1 2 MILES

MAP 2



LEGEND

▬ Wilderness Study Area Boundary

▩ Recommended Suitable for Wilderness

▨ Recommended Non-suitable for Wilderness

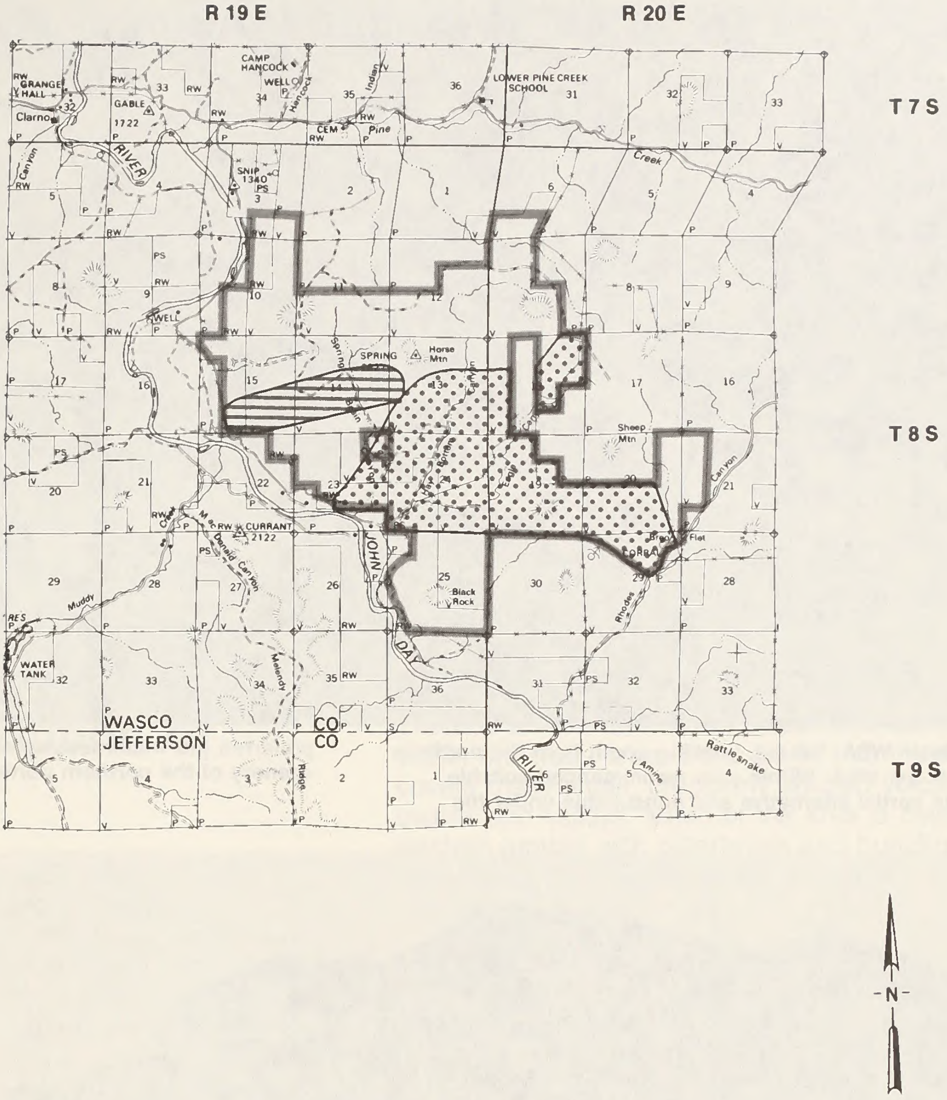
U. S. Department of the Interior
Bureau of Land Management
Prineville District

Spring Basin WSA
OR-5-9

PARTIAL ALTERNATIVE

1 0 1 2 MILES

MAP 3



░ **Medium Potential (3C) for Zinc, Mercury, Lithium and Molybdenum**

▤ **Medium Potential (3C) for Semiprecious Stones**

Entire WSA:
Medium Potential (3C) for Oil and Gas

U. S. Department of the Interior
Bureau of Land Management
Prineville District

Spring Basin WSA
OR-5-9

MEDIUM OR HIGH POTENTIAL MINERAL OR ENERGY RESOURCES

1 0 1 2 MILES

MAP 4

Spring Basin WSA, OR-5-9. Looking south from the northern portion of the WSA. Within area recommended suitable under the partial alternative and nonsuitable under the preferred (no wilderness/no action) alternative. Typical scenery of the northern portion of the WSA. September 1979.

Spring Basin WSA, OR-5-9. Looking north toward Horse Mountain in the central portion of the WSA. Within area recommended suitable under the partial alternative and nonsuitable under the preferred (no wilderness/no action) alternative. Horse Mountain is a prominent geologic feature in the WSA.September 1979.

Appendix to the Wilderness Environmental Impact Statement for Oregon

Badlands Wilderness Study Area (OR-5-21)

General Description of Study Area

The Badlands wilderness study area (WSA) is located in Deschutes and Crook Counties, approximately 25 miles east of Bend, Oregon and about 150 miles southeast of Portland, Oregon (see map 1). The nearest highway is U.S. Highway 20 which forms the southern and southwestern boundary of the WSA.

The WSA contains 32,221 acres of public land. That includes 168 acres in the Dry River Canyon on the southeast edge of the WSA which were incorrectly excluded during the inventory but later added when the error was discovered. There is a 40-acre inholding of private land located near the northeastern boundary (see map 2).

The Badlands WSA is relatively solid in shape. It is characterized by rolling hills and basalt escarpments with jagged outcroppings. Adjacent land is mostly public, except for private land in the north.

The western and southern boundaries are formed by a combination of private property, U.S. Highway 20, and a BLM-maintained road. The northern boundary is formed by a canal and private land. A powerline and maintenance road forms the eastern boundary.

There is a wide diversity of basalt flow formations within the study area. Sand blown into the region covers many small, irregularly shaped volcanic basins and valleys. Much of the area is covered by western juniper with bitterbrush and bunchgrass comprising the majority of the understory.

Reynolds Pond and a small unnamed pond in the northwest portion of the WSA are the only surface water. Reynolds Pond is part of the Central Oregon Irrigation Canal System. Both ponds are fed by the irrigation canal forming the northwestern boundary of the WSA. Water levels in the ponds are dependent on flows in the canal and consequently fluctuate widely. When full, Reynolds Pond covers 8 surface acres and the small pond less than 1 acre. Overall water quality meets state standards.

Interrelationships

A primary canal, operated by the Central Oregon Irrigation District and providing irrigation water to agricultural lands to the north, is adjacent to the Badlands WSA and forms about 3 miles of the northwest boundary. The canal itself does not have an impact on the study area. However, the operation and maintenance activities associated with this irrigation system affect the amount of surface water and the type and amount of hunting and fishing recreation in the area.

Approximately the northern third of the study area falls within lands which were ceded to the U.S. Government by the Warm Springs Indian Tribe by ratified treaty. This treaty reserved to the Indians rights for hunting, fishing and gathering in usual and accustomed places and for grazing livestock on unclaimed land.

Issues

Issues relating to each WSA were raised by BLM and the public during the wilderness inventory and EIS planning and scoping process. These issues concern both the effects of wilderness designation on existing and potential land uses or resources in the WSA, as well as the effects of existing and potential land uses or resources on wilderness values. Land uses or resources raised as issues specifically for this WSA include:

- proposed range improvement projects and use of vehicles for livestock management (water hauling) in the area;

- potential geothermal and oil and gas development; and

- organized, competitive and cross-country recreational vehicle use occurring in the area.

Description of the Alternatives

The following alternatives are analyzed:

- all wilderness
- partial (preferred alternative)
- no wilderness/no action

An enhanced wilderness alternative was not analyzed because no feasible opportunity exists to significantly enhance wilderness values through interior road closures, acquisition of private inholdings or addition of other tracts of public land.

All Wilderness

Under the all wilderness alternative, all 32,221 acres of public land in the Badlands WSA would be recommended suitable as wilderness (see map 2). For purposes of analysis, it is assumed the 40-acre private inholding would remain in private ownership.

Partial (Preferred Alternative)

Under the partial alternative, 20,727 acres of the Badlands WSA would be recommended suitable for wilderness designation (see map 3). An attempt would be made to acquire the 40-acre private inholding, which could be acquired through purchase or exchange with willing landowners. Assuming acquisition of this parcel, total area recommended suitable under this alternative would be 20,767 acres.

The remaining 11,494 acres would be recommended as nonsuitable for wilderness designation, primarily due to signs of man, limited opportunities for solitude and recreation, and the benefits of keeping those portions open to geothermal exploration and development.

North and south boundaries of the area under this alternative would be defined by a combination of private property as well as BLM- and county-maintained roads. In the northwest corner, the boundary would be a fence along a section line between the recommended wilderness and a narrow arm of the WSA recommended as nonsuitable. The western boundary would be a combination of U.S. Highway 20, adjacent private property, BLM access routes (ways, vehicle routes established and maintained solely by the passage of vehicles), and a fence around Reynolds Pond. The eastern boundary would be formed by a BLM access route.

No Wilderness/No Action

The no wilderness/no action alternative would recommend the entire WSA nonsuitable as wilderness. It represents the situation most likely to occur without wilderness designation. The area would be managed according to the current land use plan, which includes the following features relevant to this analysis:

- availability of 6,160 acres for juniper firewood harvest;

- implementation of proposed range improvement projects, including brush and juniper control and seeding for livestock, and water developments for wildlife;

- continued use of motorized vehicles, including 5,735 acres which would continue to be managed as the BLM Millican Off-Road Vehicle Recreation Area; and

- continued availability for mineral exploration and development, including possible geothermal development.

Table 1 summarizes the proposed management of the WSA under each alternative.

Table 2 summarizes the environmental consequences of each alternative.

Manageability of the Area as Wilderness

The entire Badlands WSA is manageable as wilderness. There are factors, however, which could affect manageability of the area to a limited degree in the future. These include the maintenance and redevelopment of existing range projects and possible development or change in use of a 40-acre private inholding. This inholding is now used for livestock grazing and there has been no expressed interest in changing its use.

If the Badlands WSA were designated wilderness, existing range development projects, including fencing, ponds, and juniper control (woodcutting), could be maintained or reconstructed by mechanized equipment, if needed to maintain current levels of livestock grazing, if there were no practical alternatives, and if it conformed with Wilderness Management Policy. The juniper control project would be in the area recommended nonsuitable for wilderness in the partial alternative.

Table 1. Summary of Proposed Management Under Each Alternative, Badlands WSA (OR-5-21)

Proposed Management	All Wilderness	Partial	No Wilderness/ No Action
Acres Designated as Wilderness	32,221	20,727	0
Acres Closed to ORVs by Wilderness Designation	32,221	20,727	0
Miles of Ways Closed	58.1	31.6	0
Acres of Full Fee Estate Acquired[1]	0	40	0
Acres Withdrawn from Mineral Location and Leasing by Wilderness Designation	32,221	20,727	0
Structural Wildlife Projects Developed: Catchments & Guzzlers (number)	0-6	0-6	6
Vegetative Manipulation for Livestock:			
Brush Control without Seeding (acres)	0	130	130
Brush Control with Seeding (acres)	0	130	130
Juniper Control w/o Seeding (acres)	0	521	521
Acres of Suitable Minor Forest Products Available for Harvest	0	6,160	6,160

[1] Upon acquisition, these additional lands would be incorporated into the wilderness area, closed to vehicle use, and withdrawn from mineral location and leasing.

Livestock grazing requires hauling water into the study area during the grazing season. Water hauling by vehicle and maintenance of facilities would adversely affect the manageability of the area as wilderness. However, wilderness values would not be seriously degraded because the dense juniper and the maze of lava ridges would prevent visitors from being aware of the activity on the ways even a short distance away.

Rationale for Selection of the Preferred Alternative

The partial alternative is preferred because the portion of the Badlands WSA recommended as suitable under this alternative is generally free of signs of human activities and appears to have been affected primarily by the forces of nature. It is a manageable block of public land which allows essentially unrestricted movement throughout the area.

This alternative includes lands containing special features and outstanding opportunities for solitude or primitive and unconfined types of recreation. The 20,727-acre wilderness area would provide a unique wilderness opportunity because of the dense old-growth juniper cover and variety of basalt rock formations. The area is adjacent to U.S. Highway 20, a major travel route, near a population center (Bend/Redmond) and is usable on a year-around basis.

The existing ways, water developments and a very small portion of an old bombing range within this 20,727-acre area are substantially unnoticeable. They are reverting to a natural condition and topography and vegetation also screen them from view. There are no activities occurring on the private inholding which impair the outstanding wilderness characteristics of the WSA.

Five separate portions of the study area totaling 11,494 acres would be recommended as nonsuitable for wilderness designation. The eastern fourth of the WSA and the southwestern corner have fewer opportunities for solitude and primitive recreation because the basalt ridges are not as pronounced as in the rest of the WSA. Stumps in the juniper control area in the northeast corner of

Table 2. Summary of Environmental Consequences of Alternatives, Badlands WSA (OR-5-21)

Resource or Activity	All Wilderness	Partial (Preferred Alternative)	No Wilderness/No Action
Wilderness Values	Would add 32,221 acres to the NWPS, and preserve wilderness characteristics on entire WSA, including unique area of dense juniper woodland and maze of low lava ridges and sandy basins near a major travel route and population center. Elimination of motor vehicles would enhance solitude, primitive recreation and wildlife values. Closure of 58 miles of ways would allow revegetation and enhance naturalness. The entire area would be manageable as wilderness	Would add 20,767 acres to NWPS, assuming acquisition of 40-acre private inholding. Preservation of the highest wilderness characteristics in the WSA would be assured in area recommended suitable and it would be manageable as wilderness. Closure and revegetation of 32 miles of ways would enhance naturalness. In the nonsuitable portion, wilderness values would be adversely affected by proposed 521 acres of juniper control, 130 acres of brush control, 130 acres of burn-and-seed, and by vehicle-oriented recreation. Sand and gravel and geothermal development could also occur and could adversely affect wilderness values.	Effects would be similar to nonsuitable portion under partial, except that wildlife guzzlers would also be built, adversely affecting wilderness values.
Energy and Mineral Development	Development precluded on 32,221 acres, including 32,053 acres with moderate potential for geothermal and 3,010 acres with moderate potential for sand and gravel.	Development precluded on 20,727 acres, plus an additional 40 acres if acquired, including 20,727 acres with moderate potential for geothermal and 2,690 acres with moderate potential for sand and gravel.	No impact.
Vegetation	Vegetation preserved.	Vegetation preserved in suitable portion. All proposed vegetative manipulation projects would be in nonsuitable portion where they would reduce vegetation diversity through 130 acres brush control, 521 acres juniper control and another 130 acres of burn-and-seed.	All vegetative manipulation projects allowed. Effects same as partial alternative.
Wildlife	If guzzlers not allowed, opportunity to increase nongame wildlife numbers would be foregone. Wildlife habitat preserved.	Same as all wilderness in suitable area.	Guzzler installation would increase numbers of nongame wildlife.
Livestock Grazing	Potential increase of 56 AUMs would be foregone. Juniper cutting to maintain livestock grazing may be foregone. Vehicle use restricted on 58 miles of ways, except vehicle use to haul water would continue on 15 miles.	Forage increased by 56 AUMs through projects. Vehicle use restricted on 32 miles of ways, except vehicle use to haul water would continue on 15 miles.	Same as partial, except no restriction on vehicle use.
Wood Products Harvest	Harvest of 150 cords of juniper firewood per year would be foregone.	Harvest of 150 cords of firewood annually.	Same as partial.
Recreation Use	Vehicle-oriented recreation use by hunters and ORV users would be eliminated. There would be a small initial increase in primitive recreation, with a large net reduction in overall recreation use for a short period of time. Primitive types of recreation would gradually increase to the point where it would be greater than existing vehicle-oriented use.	Similar to all wilderness, but vehicle-oriented recreation use allowed in nonsuitable portion, which would adversely affect opportunities for primitive recreation in this area (11,494 acres). Net increase in overall recreation use. Recreation use would be highest under this alternative.	Development activities would reduce primitive recreation use and adversely affect opportunities for primitive recreation. Vehicle-oriented recreation levels would continue to increase, as in the past. (Increase would be less than increase under other alternatives.) Overall, no impact on recreation use.

Economic Value and Local Income	Decrease in economic value and local personal income by $8,886 and $2,560, respectively, if proposed projects and grazing increases are not allowed, and from loss of firewood harvest and oil and gas leases. Decrease in economic value and local personal income by $7,896 and and $1,832, respectively, if proposed projects and grazing increases are allowed, and including loss of firewood harvest and oil and gas leases. Maximum increase in transportation costs to livestock operators would be $11.	Decrease in economic value and local personal income by $8,668 and $1,591, respectively, if proposed projects and grazing increases are not allowed, and from loss of firewood harvest and oil and gas leases. Decrease in economic value and local personal income by $7,678 and $863, respectively, if proposed projects and grazing increases are allowed, and including loss of firewood harvest and oil and gas leases. Maximum increase in transportation costs to livestock operators would be $11.	Increase in economic value and local personal income by $833 and $1,697, respectively, from construction of proposed projects and from grazing increases.

the WSA detract from the naturalness of the area. These portions would be recommended as nonsuitable for wilderness because the benefits of retaining opportunities for geothermal exploration and development would outweigh the benefits of preserving the wilderness values.

A narrow arm protruding from the northern boundary of the WSA would be recommended nonsuitable because it offers limited opportunities for solitude and recreation. A small area around and including Reynolds Pond would also be recommended nonsuitable for wilderness because of the reduced naturalness of the area. The Central Oregon Irrigation District constructed the pond and uses it as an irrigation waste water dump.

Affected Environment

This section discusses only those activities or resources that influence the character of the study area, or that may be affected by the alternatives.

Wilderness Values

Naturalness

Most of the WSA appears to be primarily affected by the forces of nature and generally remains in a natural condition. Minor signs of human activity are dispersed throughout the area, except in the northeastern portion where ways and cut juniper tree stumps are more concentrated. Man-made features within the study area include: 23.6 miles of fence, 2 reservoirs, 2 guzzlers (wildlife watering devices), 3,160 acres of juniper control (woodcutting), and 58 miles of ways. Most of these ways are reverting back to a natural appearance primarily due to the sandy, rocky terrain and infrequent use.

In addition, 5,735 acres of the study area are also part of the BLM Millican Valley Off Road Vehicle Recreation Area. Dirt bike races occasionally run through the area on existing trails; however, the natural character of these lands has not been substantially affected due to the rocky, sandy characteristics of the terrain.

The old, 3,160-acre BLM woodcutting area in the northeastern portion is less natural in character than the remaining public lands in the study area. There is good potential for rehabilitation of this area.

Water levels in Reynolds Pond fluctuate with water levels in the canal along the west boundary of the WSA, and exposed mudflats periodically detract from the naturalness of the immediate vicinity.

Signs of human activity influence, to varying degrees, about 26 percent of the study area. (The area of influence is an estimate of the acreage within the WSA from which these signs of human activity can be seen.) The cumulative effect of these man-made features is not substantial due to the types of developments, the large size of the study area, vegetative and topographic screening, and the dispersal of these developments throughout the area.

Outside sights and sounds from U.S. Highway 20 also influence small portions of the study area. However, none of these sights or sounds was found to be substantial enough to adversely affect the natural quality of the area. The area's large size and natural screnning qualities reduce most of these intrusive outside impacts on wilderness values.

Opportunities for Solitude or Primitive and Unconfined Types of Recreation

The Badlands WSA has outstanding opportunities for solitude due to its large size and compact shape. Its topographic and vegetative screening also contribute to the area's opportunities for solitude.

Numerous sandy basins ringed with basalt flows and dense clusters of juniper trees are concentrated in the middle of the study area. The basalt flows and dense juniper-tree cover offer ideal locations for anyone seeking a high degree of seclusion. The area has a more open and flat character in the eastern and western portions.

The junipers are not as dense in the northeastern portion of the WSA, and the basalt ridges are less pronounced in that area. As a result, there are fewer opportunities for solitude and primitive recreation in those areas than in other parts of the WSA. Opportunities for solitude and primitive recreation are also limited in a narrow arm that projects from the north boundary of the WSA. Visitors in that area would also have fewer opportunities to avoid other visitors than in the central portion of the study area because there are fewer basalt ridges.

Outstanding opportunities for several different types of primitive recreation are available in the study area, including hunting, nature study, photography, sightseeing, and horseback riding.

There are also outstanding opportunities for hiking in the Badlands. Such hiking can be challenging, because the topography and especially the dense stands of juniper trees create an impression of sameness or uniformity for first time or casual visitors in this area. It is very difficult for hikers to accurately determine their location due to the size and topography of the area and the numerous juniper trees. The height and density of the juniper trees make distant landmarks difficult to locate. The rugged, isolated environment also provides excellent opportunities for primitive camping.

Special Features

Special features within the Badlands WSA have cultural, geological, botanical and zoological appeal.

Cultural features in the WSA are described later in this appendix. Some of the archeological features in the WSA have been vandalized.

Countless basalt pressure ridges, formed by the compressive force of slowly moving subcrustal lava, were twisted into many shapes and formations.

The Dry River, a dry prehistoric river channel, winds through the study area. Erosion has created interesting features in the southeast portion of the study area, such as carved and smoothed boulders and small, narrow cuts through basalt ridges.

Cryptograms (mosses, lichens, etc.) grow on the basalt formations throughout the area and are a special attraction for some visitors.

Crucial mule deer winter range covers the southern portion of the study area.

Diversity in the National Wilderness Preservation System (NWPS)

According to the Bailey-Küchler system of classifying ecosystems, the WSA is in the Intermountain Sagebrush Province and has sagebrush steppe with juniper as its potential natural vegetation. Of the vegetative communities listed in the High Lava Plains section of the Oregon Natural Heritage Plan, the WSA has western juniper/big sagebrush/wheatgrass and western juniper/Idaho fescue ecosystems.

Six standard metropolitan statistical areas with population over 100,000 are within 5 hours' driving time of the Badlands WSA: Medford, Eugene/Springfield, Portland and Salem, Oregon; and Richland/Kennewick/Pasco and Yakima, Washington.

Energy and Mineral Development

Energy and mineral resources were evaluated from available geologic data supplemented by a limited amount of geochemical rock chip sampling. Technical details of the findings of the evaluation are in a BLM report and file titled "Assessment of Geology, Energy, and Minerals (GEM) Resources, Badlands WSA." The area has been classified according to a rating system that indicates both the potential for occurrence (geologic favorability) of certain minerals, as well as the amount and quality of data on which the rating was based (confidence level). A description of the rating system is provided in the Statewide EIS volume.

A few rock chip samples indicate a lack of favorability for any metallic mineral. Some unknown amount of surface volcanic rock has been removed from the area for use as facing stone; however, the extent and use of this resource is not great. A moderate potential exists in two areas for sand and gravel; however, no large, high quality deposits are expected.

Geothermal potential of the WSA is rated moderate, strictly based on its proximity to two areas of moderate to high geothermal favorability. The WSA lies between Newberry Crater and Powell Buttes. Drilling in Newberry Crater has found a heat source which is perhaps the best potential geothermal resource in the state. The extent of this deposit is only speculative at this time. Drilling and testing on the northwest flank of Powell Buttes has shown a moderate temperature resource.

The entire study area is considered moderately favorable for geothermal resources. Portions of the study area are moderately favorable for sand and gravel.

Table 3 shows the mineral potential classifications in the WSA. Map 4 shows the portions which have been rated moderate (medium) for sand and gravel.

As of January 1,1984, three oil and gas leases (containing stipulations precluding impairment of wilderness values) have been issued for 8,500 acres in the eastern portion of the study area. There were no mining claims or geothermal leases in the study area as of January 1, 1984.

Exposed rocks in the study area are Tertiary and Quaternary basalt flows. Subsurface rocks are probably Quaternary and Tertiary stream and lake sediments consisting of gravels, sands, and silts of volcanic origin.

Table 3. Classification of Energy and Mineral Potential, Badlands WSA (OR-5-21)

Commodity	Area	Classification Level	Confidence Level
Metals	Entire WSA	2	B
Diatomite	Entire WSA	2	B
Limestone	Entire WSA	2	B
Zeolites	Entire WSA	2	B
Bentonite	Entire WSA	2	B
Uranium/Thorium	Entire WSA	1	B
Geothermal	Entire WSA	3	C
Oil/Gas	Entire WSA	2	C
Sodium/Potassium	Entire WSA	2	B
Coal	Entire WSA	1	B
Tar Sands/Oil Shale	Entire WSA	1	B
Sand/Gravel	See map 4	3	C
	Rest of WSA	2	C
Crushable Rock	Entire WSA	2	C

Legend:
Class 1 - Lack of indications of favorability
Class 2 - Low favorability
Class 3 - Moderate favorability
Class 4 - High favorability

Confidence Level A - Insufficient data or no direct evidence
Confidence Level B - Indirect evidence available
Confidence Level C - Direct evidence but quantitatively minimal
Confidence Level D - Abundant direct and indirect evidence

Vegetation

Western juniper is the dominant vegetation in the Badlands WSA. Almost all of the area is within a juniper forest, much of it old, mature trees. Understory species include big sagebrush, gray and green rabbitbrush, bitterbrush, squirreltail grass, bluebunch wheatgrass, Idaho fescue, and cheatgrass, along with many forbs.

Most of the vegetation of the area is in early-seral stage. (Seral refers to a stage of ecological condition based on the difference between the present plant community and climax vegetation, the relatively stable, final stage in plant succession.) The rest of the WSA is in mid-seral stage. The potential climax vegetation of the WSA is predominantly an Idaho fescue type with a western juniper overstory. Other plants include big sagebrush, bitterbrush, and bluebunch wheatgrass in lesser amounts. Very little Idaho fescue or bluebunch wheatgrass remains in the study area and there is a corresponding abundance of sagebrush and rabbitbrush, as well as a prolific spread of western juniper.

Wildlife

Game animals in the area include mule deer, antelope, upland birds and waterfowl. Many small mammals and nongame birds also inhabit the area. The one fish species present is largemouth bass in Reynolds Pond. Furbearers are limited primarily to bobcats.

There are 2,720 acres of crucial deer winter range supporting approximately 65 deer during the winter months. The Oregon Department of Fish and Wildlife (ODFW) would like to see this area support approximately 75 deer during the winter months.

Two guzzlers are located in the WSA, one in the western half and one in the eastern third of the WSA. Six guzzlers are proposed to enhance habitat for bird and other nongame species; they would also have benefits for mule deer.

Approximately 2 acres of riparian habitat, in fair condition, are located adjacent to Reynolds Pond.

Livestock Grazing

Portions of six grazing allotments lie within the Badlands WSA. Table 4 summarizes existing and potential livestock use in AUMs (animal unit months, the amount of forage needed to sustain one cow and calf, or equivalent animals, for one month).

Existing livestock developments (among the man-made developments mentioned in the Naturalness section) include 23.6 miles of fence and 2 reservoirs.

Proposed livestock developments include 130 acres of brush control, 521 acres of juniper control, and another 130 acres of burn-and-seed. These vegetative manipulation projects are projected to increase allocated livestock forage by 56 AUMs. Most of the potential increases would be in the Rambo Allotment, located in the northern portion of the WSA.

Livestock operators haul water for cattle on about 15 miles of ways. Some of the ways extend into the center of the study area from the north and south, and others are located in the eastern portion of the study area. Water hauled on the ways is the only livestock water in most of the study area. Water is normally hauled every 2 to 3 days between April and November. Vehicles are also used for general livestock supervision and major maintenance of fences. Most movement of cattle and other intense supervision, as well as fence inspection and light maintenance, is done on horseback.

A 3,160 acre portion of the WSA is periodically cleared of juniper to maintain current levels of livestock grazing. This juniper is harvested for firewood.

Wood Products Harvest

Prior to designating the Badlands area as a WSA, juniper firewood had been harvested in 3,160 acres in the northeast portion of the area, primarily to maintain existing livestock forage. It is estimated that this area still contains a total of about 6,000 cords. An additional 9,000 cords of firewood could be harvested from 3,000 acres elsewhere in the WSA.

More than 1,000 firewood cutting permits are issued annually for areas of similar character and accessibility as the Badlands, indicating local demand for the wood.

Table 4. Existing and Potential Livestock Use, Badlands WSA (OR-5-21)

Grazing Allotment	Licensed AUMs in Allot.	Period of Use	Percent of Allot. in WSA	Current Actual Use in WSA (AUMs)	Potential Increase in WSA (AUMs)
Lava Beds Community (No. 5209)	508	04/01-09/25	95	482	0
Michaels (No. 5207)	196	04/15-09/23	43	85	0
Millican (No. 5212)	2,800	04/01-10/30	2	60	8
Rambo (No. 5213)	605	04/15-11/15	59	358	48
Sinclair (No. 5204)	30	04/15-09/23	73	22	0
Zell Pond (No. 5108)	75	04/15-11/04	67	50	0
Totals	4,214			1,057	56

Cultural Resources

The historic Emigrant Trail is believed to have passed through the Badlands WSA. Portions of this trail may have followed the route of the Meeks and Elliot cutoff trail. Archeological features (pictographs) have also been found in the WSA.

Recreation Use

The Badlands WSA is a popular area and recreationists visit the area by motorized vehicles, or by hiking and horseback riding. Random ORV use, hunting, shooting, and hiking appear to be the predominant activities now occurring in the study area and appear to be slowly increasing. The area has also been used for organized, competitive motorcycle racing and sightseeing. ORV opportunities such as those available in the Badlands WSA, with its deep sandy soils, basalt outcrops, and juniper tree cover, are uncommon in central Oregon.

Economic Value and Local Income

Resource outputs which generate economic activity in the WSA include livestock grazing, recreation, firewood, and oil and gas leases. As of January 1, 1984, there were no geothermal leases on the WSA.

Economic value and local personal income generated from existing levels of resource outputs are presented in table 5. The terms economic value and local personal income are discussed in the Statewide EIS volume.

Table 5. Economic Value and Local Personal Income Generated Annually, Existing Program, Badlands WSA (OR-5-21) (1981 price levels)

Resource Output	Unit of Measure	Quantity	Economic Value	Local Personal Income Generated
Grazing	AUM	1,057	$7,970	$18,286
Recreation (incl. hunting)	RVD	Unknown	Unknown	Unknown
Firewood	Cord	150	375	Unknown
Oil & gas leases	Acres	8,500	8,500	2,560
Total existing			16,845	20,846

Environmental Consequences

This section discusses the environmental consequences of implementing each of the alternatives. Resources and activities not significantly affected by any of the alternative are not discussed. General impact conclusions applicable to all WSAs, including impact conclusions based on speculative future developments (developments which are possible, but are not currently proposed), are discussed in the Statewide EIS volume. That volume also discusses certain assumptions that were made for this analysis.

Effects on Wilderness Values

The **all wilderness alternative** would add 32,221 acres to the National Wilderness Preservation System (NWPS). It would preserve wilderness characteristics of the entire WSA, including naturalness, opportunities for solitude or primitive and unconfined types of recreation, and special features. Most of the area has outstanding wilderness values and its designation would constitute a unique addition to the NWPS.

The thick stands of juniper trees in the maze of low lava ridges and sandy basins and the proximity of the area to a major travel route and population center make the WSA unique.

Reduction of vehicle use on 58 miles of ways would allow revegetation of these areas and a return to a more natural condition. Solitude would also be enhanced by reducing the use of motorized vehicles in the area. It would also reduce the potential for vandalism of archeological features.

Livestock operators would continue to haul livestock water with motorized vehicles on 15 miles of ways about once every two to three days during the grazing season, which extends from April through the middle of November. The water hauling would be allowed to continue because the area could not be grazed without it, and wilderness management policy provides that grazing will not be curtailed because of wilderness designation.

The water hauling would detract from visitors' opportunities for solitude in the immediate vicinity of the ways. However, because of the dense juniper and the maze of lava ridges, visitors a short distance from the ways would not be aware of the water hauling activity. Therefore, it would not seriously detract from opportunities for solitude in the area as a whole. Traffic on the haul routes would prevent those ways from revegetating and returning to a natural condition.

The 40-acre inholding is used in the same manner as the surrounding public lands, and there are no indications that the use will change in the foreseeable future. Therefore, the inholding would not seriously detract from the area's wilderness values.

The **partial alternative** would add 20,767 acres to the NWPS, assuming the 40-acre private parcel is acquired. Effects on the area recommended suitable under this alternative would be the same as the all wilderness alternative. The cultural features, most of the basalt ridges and cryptograms, the Dry River, and a portion of the crucial deer winter range would be included in the area designated wilderness. The livestock water hauling would affect the designated area as in the all wilderness alternative.

ORV use in the areas recommended nonsuitable would adversely affect solitude and some primitive recreation activities. However, there are only limited opportunities for solitude and primitive recreation in these portions, and special features are lacking. In spite of occasional intensive use by recreationists using motorized vehicles, the sandy soil in the area has and is expected to continue to minimize signs of such activity.

The most substantial adverse impact on naturalness, solitude and primitive types of recreation in the nonsuitable portion would be from activities such as motorized recreation, woodcutting and range improvement projects.

Sand and gravel as well as geothermal exploration and development, which are possible in this locale in the future, could also occur in the nonsuitable portion of the WSA.

The area recommended as suitable under this alternative would be manageable as wilderness.

Under the **no wilderness/no action alternative**, naturalness, opportunities for solitude and primitive recreation, and special features would be adversely affected by motorized recreation, proposed livestock and wildlife improvements projects, and possibly by sand and gravel and geothermal development. Other effects on wilderness under this alternative would be the same as those for the nonsuitable portion under the partial alternative.

Effects on Energy and Mineral Development

Areas designated wilderness would be withdrawn from mineral exploration and development: 32,221 acres under the **all wilderness alternative**; and 20,727 acres, plus an additional 40 acres if the private parcel were acquired as proposed, under the **partial alternative**.

These withdrawals would include the area rated moderate for geothermal resources, which encompasses the entire area, and 3,010 acres rated moderate for sand and gravel; some 2,690 acres of moderate potential sand and gravel would be withdrawn under the partial alternative.

No acreage would be withdrawn under the **no wilderness/no action alternative**.

Vegetation

Areas designated wilderness would not be subject to most surface disturbing activities. Vegetation dependent upon the existing undeveloped environment would thus be maintained.

All of the proposed vegetative manipulation projects (brush and juniper control and burn-and-seed) would occur under the **partial alternative**, as they are in the nonsuitable portions. In these portions, vegetation diversity would be reduced by temporarily eliminating juniper, shrubs and forbs and increasing grasses. In the seeding, a non-native species, crested wheatgrass, would be introduced.

Under the **no wilderness/no action alternative**, changes in vegetation would be the same as in the portions recommended nonsuitable under the partial alternative.

Effects on Wildlife

Wildlife habitat would be preserved in areas designated wilderness. Under the **all wilderness and partial alternatives**, the six wildlife guzzlers proposed within the study area might or might not be allowed, depending on a site-specific assessment of whether they would conform to

Wilderness Management Policy. If they are not constructed, an opportunity to increase populations of nongame wildlife would be foregone.

Under the **no wilderness/no action alternative**, wildlife guzzlers would be allowed, and the net impact would be an increase in nongame wildlife.

There would not be any changes in riparian succession which would affect wildlife under any of the alternatives.

Effects on Livestock Grazing

There would be no effect on existing livestock forage allocation under the **all wilderness alternative**, unless the juniper cutting to maintain existing forage is precluded. If not allowed, there would be a gradual reduction in available forage on 3,160 acres. However, an opportunity to increase livestock forage by 56 AUMs would be foregone, since proposed vegetative manipulation projects would not be allowed. The projects which would produce this increase have a benefit/cost ratio less than 1:1.

All 58 miles of vehicle access routes would be closed under the all wilderness alternative, restricting use of motorized vehicles. However, water hauling for livestock management would continue on approximately 15 miles of these ways, since there is no practical alternative.

Under the **partial alternative**, all of the vegetative manipulation projects would be implemented, and an additional 56 AUMs would be realized. Some 32 miles of way would be closed to motorized vehicles under the partial alternative, except that livestock operators would be allowed to use vehicles to haul water on 15 miles of ways since there is no practical alternative.

Under the **no wilderness/no action alternative**, effects would be the same as the partial alternative, except there would be no restrictions to vehicle use.

Effects on Wood Products Harvest

Under the **all wilderness alternative**, no firewood cutting would be allowed. This would preclude the harvest of approximately 15,000 cords of firewood on 6,160 acres of public land, or about 150 cords production per year on a 100-year rotation. This is not considered a significant impact when considering local supplies of firewood.

Under the **partial and no wilderness/no action alternatives**, all of the areas with potential for juniper firewood harvest would be in the nonsuitable portion, and about 150 cords annual production would be available for harvest.

Effects on Recreation Use

Under the **all wilderness alternative**, vehicle-oriented recreation use would be eliminated in the Badlands WSA. This would adversely affect ORV users who have historically used the area for a variety of motorized activities ranging from organized, competitive racing to sightseeing and cross-country driving. Under wilderness designation, this use would be lost.

ORV use now occurring in the Badlands would be displaced to other parts of the Millican Valley ORV area and other public lands in the region. However, none of these lands provide the opportunities offered in the Badlands.

Primitive recreation would be expected to increase moderately, and over time, would be greater than present vehicle-oriented recreation. This projection is based upon greater demands for primitive, unconfined types of recreation close to population centers (Bend, Redmond and Prineville) and the area's year-around availability due to its low elevation and accessibility from a major highway.

The impact of this alternative on overall recreation use within the study area would be a large immediate reduction.

The **partial alternative** would maintain the outstanding opportunities for primitive recreation in the area recommended suitable. Vehicle-oriented recreation would be eliminated in the portion recommended suitable; but vehicles could be used to gain access for hunting, shooting, and ORV use in the 11,494 acres recommended nonsuitable.

Vehicle-oriented recreation (hunting and ORV use) would decrease, but primitive recreation would increase in the suitable area, resulting in a net increase in overall recreation use. Total use levels under this alternative would be greater than under either the all wilderness or no wilderness/no action alternatives because both primitive and vehicle-oriented recreation users would have access to a portion of their historically used areas (ORV use in undesignated portions and primitive recreation use in the area designated as wilderness).

Under the **no wilderness/no action alternative**, levels of vehicle-oriented recreation are expected to continue to gradually increase, as they have in the past. This would reduce primitive recreation opportunities, due to development activity and sights and sounds of motorized vehicles associated with vehicle-oriented recreation. No adverse impact to vehicle-oriented recreation is expected under this alternative. There would be no impact on overall levels of recreation use under the no wilderness/no action alternative.

Effects on Economic Value and Local Income

The economic effects for the alternatives are presented in tables 6 and 7. Table 6 shows the effects on economic value and table 7, the effects on local personal income. Firewood cutting would not be allowed within an area designated as wilderness. It is not known at this time whether oil and gas development would be conducted (although the potential is low) if the area were designated wilderness. Also, it is not known whether individual proposed structural developments, such as the guzzlers proposed for this WSA, would be constructed if the area were designated wilderness. It is known that vegetative manipulation projects would not be allowed.

The columns for the wilderness alternatives show the effects as a range of values dependent upon whether structural improvements were allowed.

Currently, there is substantial dependence on vehicles for livestock water-hauling in the study area which would probably be continued under

Table 6. Effects of Alternatives on Annual Economic Value, Badlands WSA (OR-5-21) (1981 price levels)

Item	Unit of Measure	All Wilderness	Partial	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS				
Grazing:				
Investment[1]	AUM	0	+56	+56
Big game hunting[2]	RVD	0 to +27	0 to +27	+27
Upland game hunting[2]	RVD	0 to +26	0 to +26	+26
Nongame wildlife[2]	RVD	0 to +30	0 to +30	+30
Firewood	Cord	-150	0	0
Oil & gas leases	Acres	-8,500	-8,500	0
VALUE OF PROPOSED INVESTMENTS[3]				
Grazing	$	0	+309	+309
Big game hunting	$	0 to +551	0 to +551	+551
Upland game hunting	$	0 to +719	0 to +719	+719
Nongame wildlife	$	0 to +1,087	0 to +1,087	+1,087
Total[4]	$	0 to +2,358	+309 to +2,667	+2,667
Investments[5]	$	0 to -1,368	-468 to -1,834	-1,834
Net economic value	$	0 to +990	-157 to +833	+833
VALUE OF OTHER EXPECTED CHANGES IN OUTPUTS				
Firewood	$	-375	0	0
Oil and gas leases	$	-8,500	-8,500	0
Reduced access[6]	$	-11	-11	
Total	$	-8,886	-8,511	0
VALUE OF TOTAL EXPECTED CHANGES IN OUTPUTS				
All categories	$	-8,886 to -7,896	-8,668 to -7,678	+833

[1] Expected future increases due to range improvement investments.
[2] Expected future increases due to proposed structural wildlife improvement projects.
[3] Vegetative manipulation projects involving up to $15,155 in total expenditures, and structural projects involving up to $46,176. Amounts shown in the table represent combined results of both types of projects, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.
[4] Detail may not sum to "Total" due to rounding.
[5] Average annual cost of investment expenditures amortized at 7.8% over 50-year period.
[6] Additional cost (shown as negative value) due to restriction of vehicular access for livestock operator.

Table 7. Effects of Alternatives on Local Personal Income, Badlands WSA (1981 price levels)

Item	Unit of Measure	All Wilderness	Partial	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS				
Grazing:				
Investment[1]	AUM	0	+56	+56
Big game hunting [2]	RVD	0 to +27	0 to +27	+27
Upland game hunting [2]	RVD	0 to +26	0 to +26	+26
Nongame wildlife [2]	RVD	0 to +30	0 to +30	+30
Firewood	Cord	-150	0	0
Oil & gas leases	Acres	-8,500	-8,500	0
INCOME FROM PROPOSED INVESTMENTS [3]				
Grazing	$	0	+969	+969
Big game hunting	$	0 to +293	0 to +293	+293
Upland game hunting	$	0 to +435	0 to +435	+435
Nongame wildlife	$	Unknown	Unknown	Unknown
Construction activity [4]	$	0 to +2,249	+713 to +2,962	+2,962
Total [5]	$	0 to +728	+969 to +1,697	+1,697
INCOME FROM OTHER EXPECTED OUTPUT CHANGES				
Firewood	$	Unknown	Unknown	0
Oil and gas leases	$	-2,560	-2,560	0
Total [5]	$	-2,560	-2,560	0
INCOME FROM ALL OUTPUT CHANGES				
All categories [5]	$	-2,560 to -1,832	-1,591 to -863	+1,697

[1] Expected future increases due to range improvement investments.

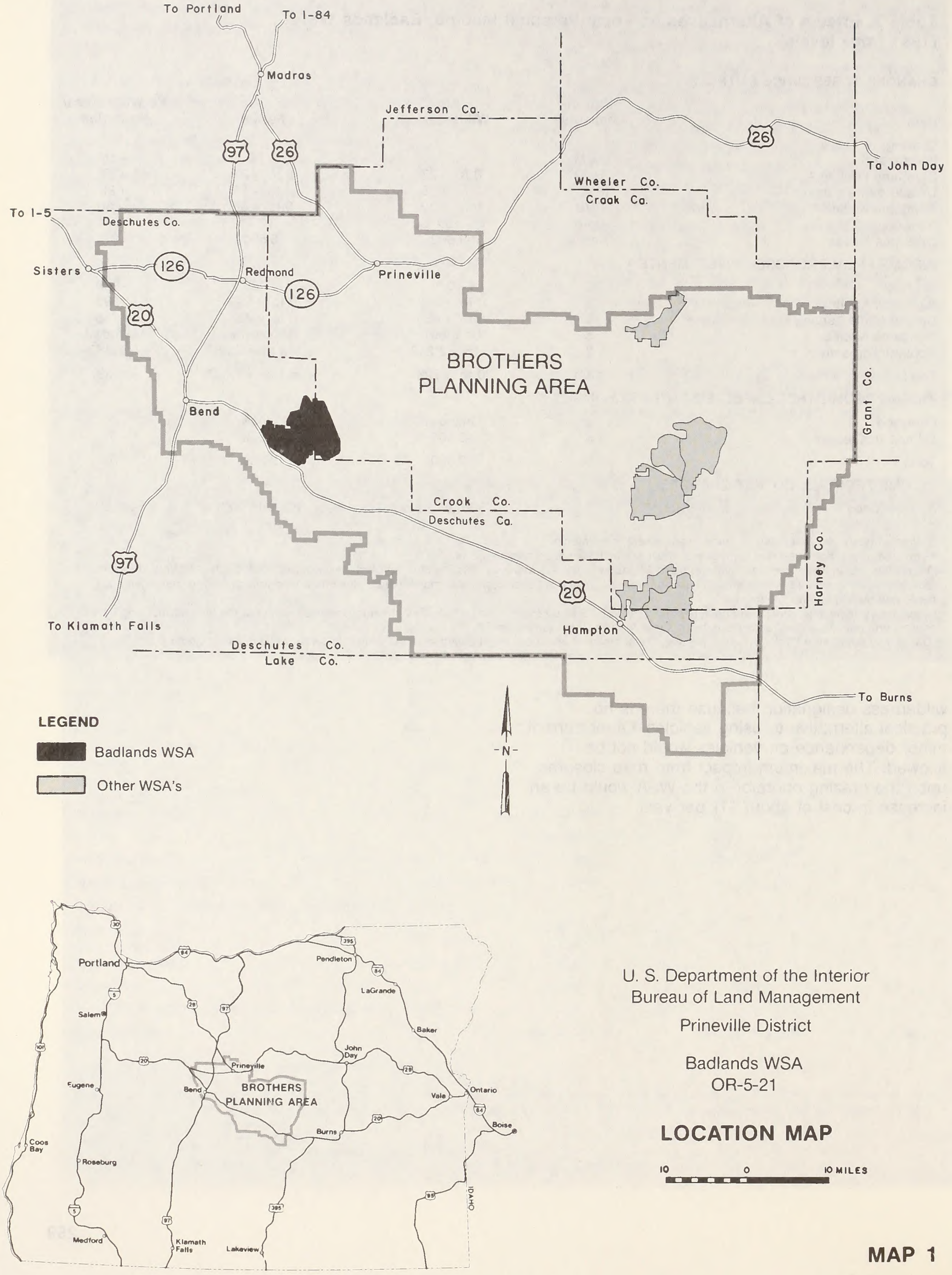
[2] Expected future increases due to proposed structural wildlife improvement projects.

[3] Vegetative manipulation projects involving up to $15,155 in total expenditures, and structural projects involving up to $46,176. Amounts shown in the table represent combined results of both types of projects, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

[4] Local personal income generated annually during assumed 5-year construction period. This amount cannot be added to the income resulting from grazing and hunting activity because it is not sustained over the analysis period.

[5] Detail may not sum to "Total" due to rounding. Total omits income from construction which is limited to 5-year period. See footnote 4.

wilderness designation because there is no practical alternative to using vehicles. Other current minor dependence on vehicles would not be allowed. The maximum impact from road closures upon the grazing operator in the WSA would be an increase in cost of about $11 per year.



U. S. Department of the Interior
Bureau of Land Management

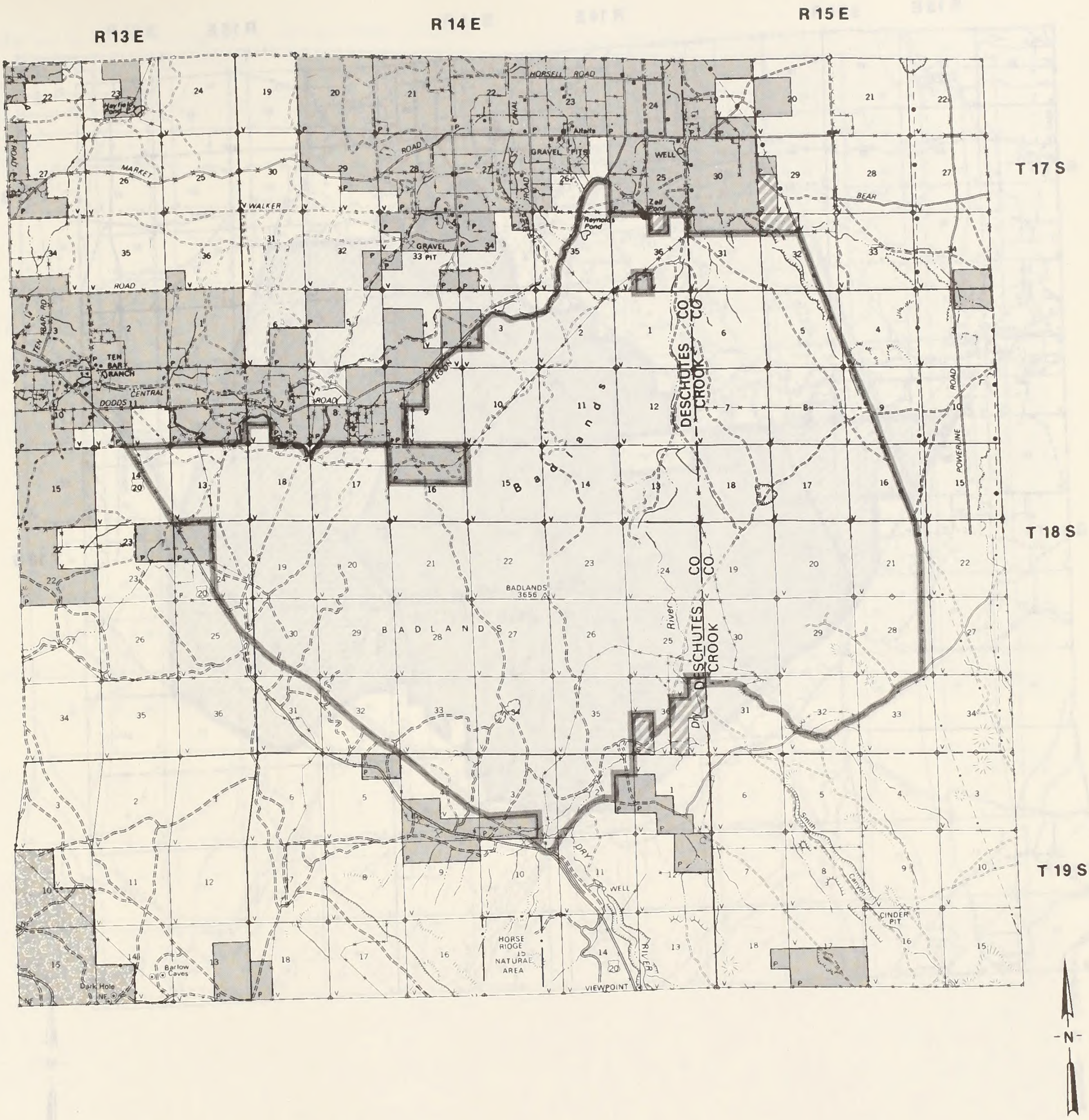
Prineville District

Badlands WSA
OR-5-21

LOCATION MAP

10 0 10 MILES

MAP 1



LEGEND

▬ Wilderness Study Area Boundary

☐ Bureau of Land Management

▨ State

▩ Private

▦ U.S. Forest Service

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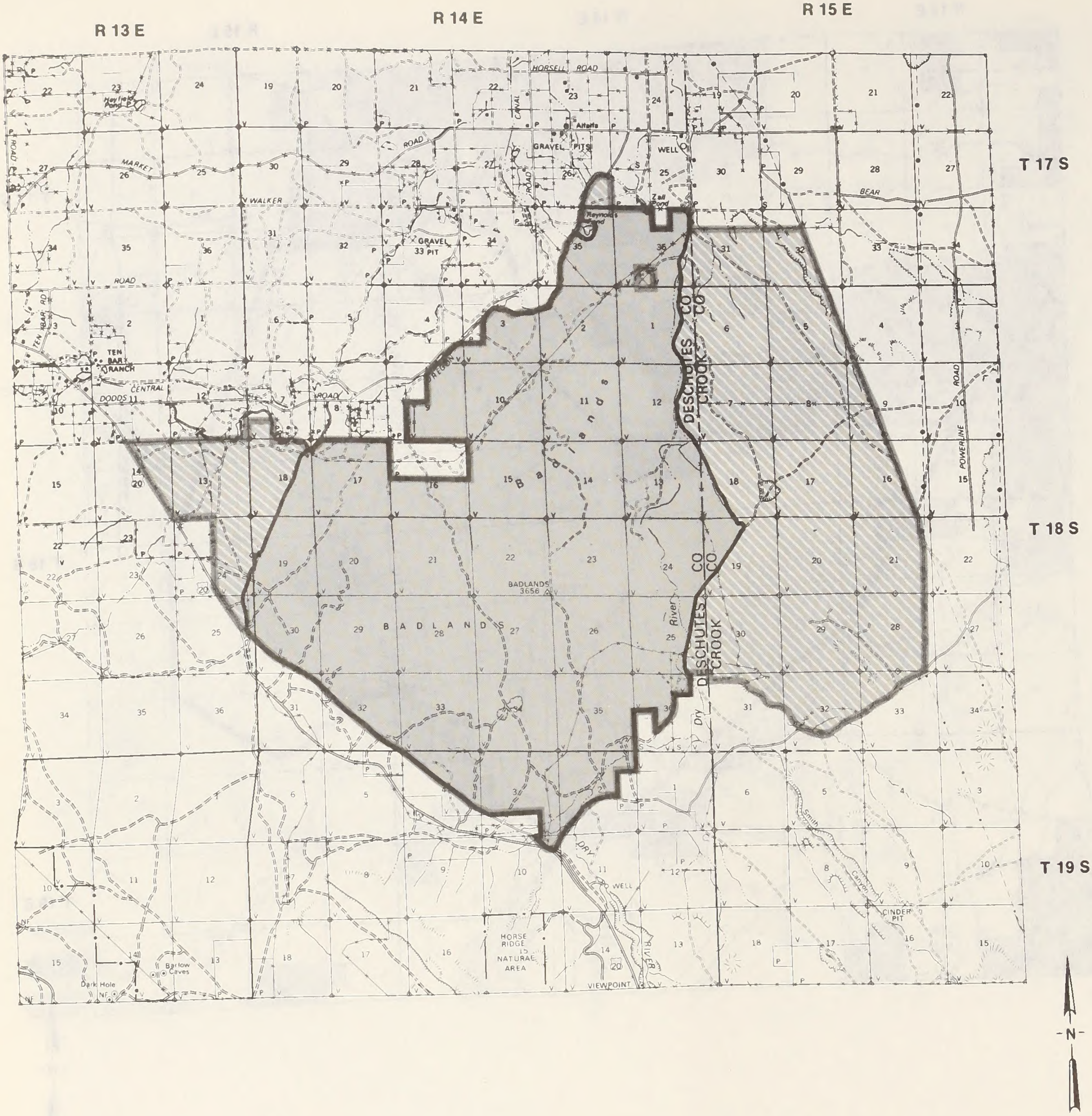
LAND OWNERSHIP

1 0 1 2 MILES

MAP 2



LEGEND

▬ Wilderness Study Area Boundary

▩ Recommended Suitable for Wilderness

▨ Recommended Non-suitable for Wilderness

▦ Non-Federal Land within Recommended Wilderness

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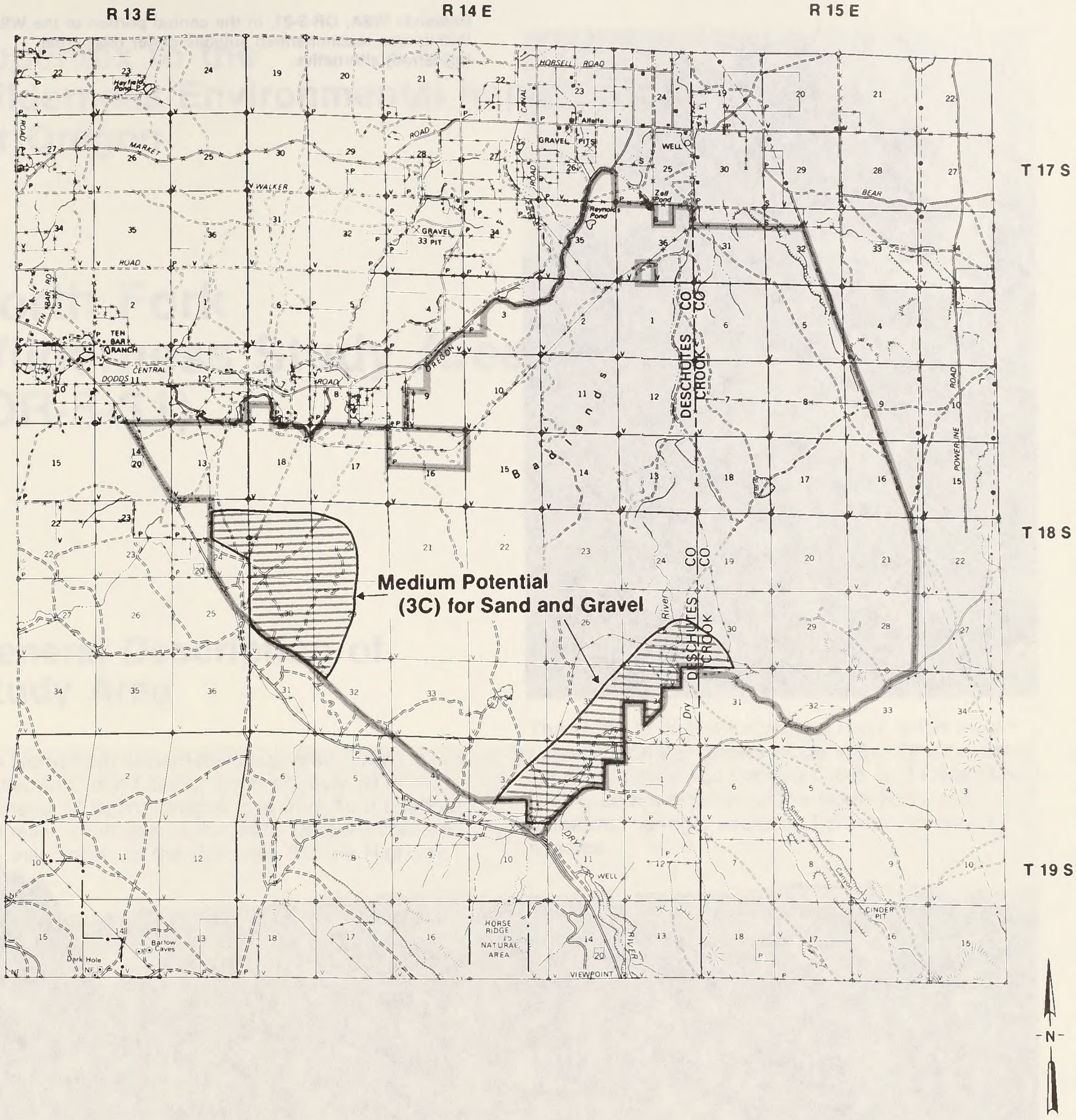
PARTIAL ALTERNATIVE

1 0 1 2 MILES

MAP 3



Entire WSA:
Medium Potential
(3C) for Geothermal Resources

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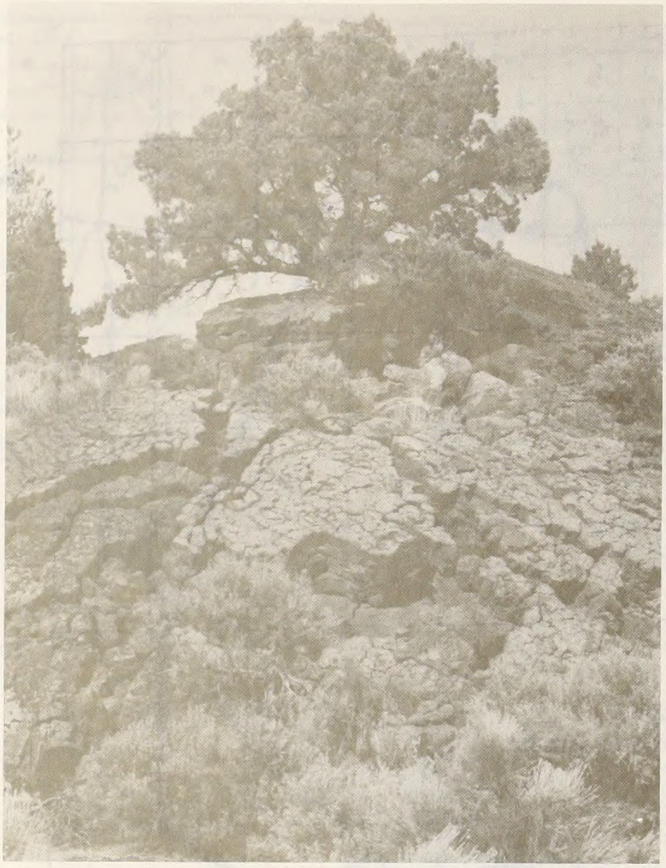
OR-5-21

MEDIUM OR HIGH POTENTIAL MINERAL OR ENERGY RESOURCES

1 0 1 2 MILES

MAP 4



Badlands WSA, OR-5-21. In the central portion of the WSA. Within area recommended suitable under the partial (preferred) alternative.

Badlands WSA, OR-5-21. Looking east into the east-central portion of the Badlands (the background is outside of the WSA). The foreground area is suitable under the partial (preferred) alternative. Illustrates juniper trees and open, sandy areas. May 1979.

Appendix to the Wilderness Environmental Impact Statement for Oregon

North Fork Wilderness Study Area (OR-5-31)

General Description of Study Area

The North Fork wilderness study area (WSA) is located in Crook County, approximately 70 miles northeast of Bend, Oregon (see map 1). It is about 200 miles southeast of Portland, Oregon. The area is 5 miles north of the Prineville-Paulina Highway.

The study area is irregularly shaped, curving along seven miles of the North Fork of the Crooked River. It contains 10,745 acres of public land (see map 2). There are 480 acres of private inholdings located near the northern boundary. The WSA is surrounded by public, private, state and National Forest land. The western and eastern boundaries of the WSA are formed by BLM maintained roads. The northern boundary is formed by lands administered by the U.S. Forest Service, private property and a BLM-maintained road. The southern boundary is formed by state and private property. Two dead-end roads totaling 1 mile in length enter the study area, forming part of the boundary.

The main feature of the WSA is the 800- to 900-foot-deep, vertical-walled canyon of the North Fork of the Crooked River. There are steeply sloped rolling hills to the east and west of the canyon.

Vegetative communities range from ponderosa pine and grass in the drainages to low sagebrush and bunchgrass on the rockier areas.

The North Fork of the Crooked River is the most noteworthy water source in the WSA. Other water sources include Fox Canyon Creek and Committee Creek, both tributaries of the North Fork, and numerous springs, seeps and smaller perennial streams.

The North Fork is a tributary of the Crooked River and has an average annual flow of 123 cubic feet per second and an average annual yield of 90,000 acre feet. Overall water quality meets state water quality standards.

Interrelationships

The North Fork WSA is bounded on the north by Forest Service land, including 1,125 adjacent roadless acres released by the Oregon Wilderness Act of 1984 from further review of wilderness values until National Forest plan revisions expected in the 1990s.

The entire WSA falls within lands which were ceded to the U.S. Government by the Warm Springs Indian Tribe by ratified treaty. This treaty reserved rights for hunting, fishing and gathering in usual and accustomed places and grazing livestock on unclaimed land.

Issues

Issues relating to each WSA were raised by BLM and the public during the wilderness inventory and EIS planning and scoping process. These issues concern both the effects of wilderness designation on existing and potential land uses or resources in the WSA, as well as the effects of existing and potential land uses or resources on wilderness values. Land uses or resources raised as issues specifically for this WSA include:

- existing oil and gas leases and potential exploration and development, and

- use of vehicles by hunters and other recreationist.

Description of the Alternatives

The following alternatives are analyzed:

- all wilderness
- enhanced wilderness
- no wilderness/no action (preferred alternative)

A partial alternative which would recommend part of the WSA as suitable for wilderness is not analyzed because there is no feasible opportunity to resolve resource conflicts by reducing the size of the WSA and still retain necessary wilderness qualities.

All Wilderness

Under the all wilderness alternative, all 10,745 acres of public land in the WSA would be recommended as suitable for wilderness designation (see map 2). For purposes of analysis, it is assumed the 480 acres of private inholdings would not be acquired.

Two dead-end roads totaling 1 mile in length would remain open to vehicle travel. These road segments are used primarily by ranchers for livestock supervision and by recreationists for hunting and fishing access.

Enhanced Wilderness

Under the enhanced wilderness alternative, all 10,745 acres of the WSA, would be recommended suitable for wilderness designation (see map 3). An attempt would be made to acquire the 480 acres of private inholdings, as well as 240 acres of adjacent state land on the southwest corner of the WSA. These parcels could be acquired through purchase or exchange with willing land owners.

Assuming acquisition of these lands, the total area recommended suitable under this alternative would be 11,465 acres. The inclusion of the state and private land would improve the opportunities for solitude and primitive recreation in the central portion of the WSA. The two dead-end roads would be closed and revegetated.

No Wilderness/No Action (Preferred Alternative)

The no wilderness/no action alternative would recommend the entire WSA nonsuitable as wilderness. It represents the situation most likely to occur without wilderness designation. The area would be managed according to the current land use plan, which includes the following features relevant to this analysis:

- implementation of livestock projects, including fencing, water developments and seeding,

- construction of wildlife projects, including stream improvement and nesting platforms,

- periodic salvage timber harvest, and

- continued availability for oil and gas development, as well as other mineral development.

Table 1 summarizes the proposed management of the WSA under each alternative.

Table 2 summarizes the environmental consequences of each alternative.

Manageability of the Area as Wilderness

The North Fork WSA would be manageable as wilderness under both the all wilderness and enhanced wilderness alternatives; however, there are factors which cause wilderness manageability problems, including private inholdings and the two dead-end roads.

Table 1. Summary of Proposed Management Under Each Alternative, North Fork WSA (OR-5-31)

Proposed Management	All Wilderness	Enhanced Wilderness	No Wilderness/ No Action
Acres Designated as Wilderness	10,745	10,745	0
Acres Closed to ORVs by Wilderness Designation	10,745	10,745	0
Miles of Roads Closed	0	1	0
Miles of Ways Closed	19	19	0
Acres of Full Fee Estate Acquired[1]	0	720	0
Acres Withdrawn from Mineral Location and Leasing by Wilderness Designation	10,745	10,745	0
Structural Wildlife Projects Developed:			
Stream Channel Projects (number)[2]	0-2	0-2	2
Nest Structures	0-14	0-14	14
Structural Livestock Projects Developed:			
Reservoirs & Waterholes (number)	0-1	0-1	1
Springs (number)	0-1	0-1	1
Fences (miles)	0-0.5	0-0.5	0.5
Average Annual Volume of Timber Sold for Harvest (Mbf-Thousand Board Feet)	0	0	11

[1] Upon acquisition, these additional lands would be incorporated into the wilderness area, closed to vehicle use, and withdrawn from mineral location and leasing.

[2] One stream project involves placement of 20 stream structures; the other involves riprap treatments over a 6.7 mile length of river.

The location of the two separate private inholdings within the Crooked River Canyon would restrict movement through the WSA. The private land is used for livestock grazing and does not presently affect the manageability of the WSA. There has been no indication that use of the private land would change.

The two dead-end roads within the WSA detract from the naturalness of the area and vehicle traffic on the roads reduces solitude. This would not be a problem in the enhanced wilderness alternative.

Rationale for Selection of the Preferred Alternative

The no wilderness/no action alternative is preferred because the benefits of maintaining options for oil and gas exploration and development and leaving the area open to the use of vehicles by hunters, fishermen and livestock operators outweigh the benefits of preserving the area's wilderness values. The area's wilderness values are reduced by the evidence of construction on abandoned logging routes and by logging and ranching activities outside the area which can be seen and heard from within the area. Two private inholdings in the canyon would complicate management of the area as wilderness.

Affected Environment

This section discusses only those activities or resources that influence the character of the study area, or that may be affected by the alternatives.

Wilderness Values

Naturalness

Although the area generally appears to be in a natural condition, a significant number of man-made features scattered throughout a large portion of the BLM part of the WSA limit naturalness. These features include 5.7 miles of fence, 3 reservoirs, 1 spring development, 113 acres of orchard grass and crested wheatgrass seeding and 19 miles of ways (vehicle routes established and maintained soley by the passage of vehicles). Some ways are reverting back to a natural appearing condition.

About 6 percent of the WSA is influenced to varying degrees by these man-made features. (The area of influence is an estimate based on the acreage within the WSA from which these features can be seen.)

Opportunities for Solitude or Primitive and Unconfined Types of Recreation

The North Fork WSA has outstanding opportunities for solitude due to vegetative screening and excellent topographic screening; however, these opportunities are limited primarily to small areas in the side canyons of the North Fork of the Crooked River and in the main canyon of the North Fork itself.

Outstanding opportunities for several different types of primitive recreation, including hiking, camping, and fishing, are available within portions of the North Fork WSA. There are also opportunities for hunting, photography, and observing wildlife. During the winter months, snowshoeing, and cross country skiing are also available, depending on winter conditions. The ruggedness and physical challenge of terrain and the geology of the narrow, deep

Table 2. Summary of Environmental Consequences of Alternatives, North Fork WSA (OR-5-31)

Resource or Activity	All Wilderness	Enhanced Wilderness	No Wilderness/No Action (Preferred Alternative)
Wilderness Values	Would add 10,745 acres to the NWPS, including 7 miles of the scenic North Fork of the Crooked River and portions of the adjacent plateau, and protect existing wilderness qualities. Nineteen miles of ways would be closed to vehicle travel and allowed to revegetate. The entire WSA is manageable as wilderness however significant manageability problems would exist due to private inholdings, and two dead-end roads. Development or use of private inholdings could adversely affect wilderness values, but there are no indications of such development or use at this time.	Would add 11,465 acres to the NWPS, assuming acquisition of 240 acres of adjacent state land, and 480 acres of private inholdings. Acquisitions and closure of roads (1 mile) and ways (19 miles) in the WSA would substantially enhance naturalness, solitude and manageability. Acquisition of private inholdings would improve the ability of users to move through the area. The WSA would be manageable as wilderness.	Wilderness characteristics would be adversely affected by vehicle-oriented recreation. Possible oil and gas development could also occur along with timber harvest. These actions would significantly reduce the naturalness, solitude and primitive recreation opportunities within the WSA.
Energy and Mineral Development	Development precluded on 10,745 acres, including 10,745 acres with high potential for oil and gas, and 960 acres with moderate potential for bentonite and zeolites.	Development precluded on 10,745 acres, plus an additional 720 acres acres if private inholdings and adjacent state land are acquired. Includes 10,745 acres with high potential for oil and gas and 960 acres with moderate potential for bentonite and zeolites.	No impact.
Vegetation	Enhanced natural succession on forest land.	Same as all wilderness.	No significant impact.
Wildlife	Possible improvement in fish habitat and populations. Maintenance of habitat diversity and big game populations.	Same as all wilderness.	Wildlife and fish habitat improvements allowed, insuring maintenance of habitat diversity and big game populations.
Livestock Grazing	Potential increase of 72 AUMs could be foregone. Use of vehicles for livestock management could be restricted.	Same as all wilderness, with possibility of additional restrictions on vehicle use for livestock management due to road closures.	No effect on existing livestock use and management. Potential increase of 72 AUMs through management would be realized.
Wood Products Harvest	Eleven Mbf annual salvage harvest precluded.	Same as all wilderness.	BLM forest land would continue to be managed as at present with 11 Mbf potential annual production available for harvest as salvage.
Recreation Use	A significant reduction in vehicle-oriented recreation use by hunters and fishermen would be partially offset by a moderate increase in primitive recreation with a moderate overall reduction in recreation use. This use would be displaced to other nearby areas. Would enhance opportunities for primitive recreation.	Similar to all wilderness. Closure of all interior roads would further enhance outstanding opportunities for primitive recreation. However, this would result in further decreases in vehicle-oriented recreation use by hunters and fishermen. A moderate overall reduction in recreation use would occur.	Recreation levels would continue to increase, overall levels of recreation would be the highest under this alternative. Timber salvage, vehicle-oriented recreation, and livestock projects would adversely affect solitude and primitive recreation.
Economic Value and Local Income	Decrease in economic value and local personal income by $11,266 and $3,420, respectively, if proposed projects and grazing increases are not allowed, and from loss of timber harvest and oil and gas leases. Decrease in economic value by $2,239 and decrease in local personal income by $303 if proposed projects and grazing increases are allowed, and including loss of timber harvest and oil and gas leases. The maximum increase in transportation costs of livestock operators would be $57.	Decrease in economic value and local personal income by $11,986 and $3,637, respectively, if proposed projects and grazing increases are not allowed, and from loss of timber harvest and oil and gas leases. Decrease in economic value by $2,959 and decrease in local personal income by $520 if proposed projects and grazing increases are allowed, and including loss of timber harvest and oil and gas leases. The maximum increase in transportation costs to livestock operators would be $57.	Increase in economic value and local personal income by $9,027 and $3,117, respectively, from construction of proposed projects and from grazing increases.

Crooked River Canyon twisting through approximately 7 miles of the WSA enhances the quality of these recreational activities.

However, these opportunities are limited by two private inholdings in the Crooked River Canyon. The inholdings restrict freedom of movement in the canyon, which is also the main area of use and primary travel corridor for the WSA. The rugged terrain of the Crooked River Canyon, along with the size and shape of the WSA, make it highly unlikely that the average visitor would hike around these private inholdings.

Special Features

The area's special wilderness features include scenic and zoological values. Although not unique geologically, the North Fork of the Crooked River Canyon is very scenic. Winding about 7 miles through the middle of this WSA, it was created by the erosive action of the North Fork of the Crooked River. The depth of this vertical-walled canyon varies, with some portions being exposed to a depth of 800 to 900 feet. It generally ranges from 300 to 500 feet. The canyon of the North Fork is an excellent example of how the forces of nature have cut a narrow, winding, secluded canyon with steep side-slopes and cliffs in a high desert plateau.

In addition to the more common wildlife species such as mule deer and antelope, Rocky Mountain elk and various raptors also inhabit the WSA. Populations of rainbow trout, smallmouth bass, brown bullhead, leopard and speckled dace, sculpin and other fish species are also present. The northern bald eagle, federally listed as threatened in Oregon, is presumed to occasionally visit the area during the winter months.

A plant species of special interest, *Calochortus longebarbatus*, is suspected to occur in the WSA. (This plant is further discussed in the Vegetation section.)

Diversity in the National Wilderness Preservation System (NWPS)

According to the Bailey-Küchler system of classifying ecosystems, the North Fork WSA is located in the Rocky Mountain Forest and Intermountain Sagebrush Provinces and the potential natural vegetation is the western ponderosa forest and sagebrush steppe with juniper. Of the vegetative communities listed in the Ochoco-Blue-Wallowa Mountain section of the Oregon Natural Heritage Plan, the WSA contains western juniper/bluebunch wheatgrass, western juniper/rigid sagebrush/Sandberg's bluegrass and ponderosa pine/bunchgrass.

There are several standard metropolitan statistical areas over 100,000 population within 5 hours' driving time of the North Fork WSA: Medford, Eugene/Springfield, Portland, and Salem, Oregon; Richland/Kennewick/Pasco and Yakima, Washington; and Boise, Idaho.

Energy and Mineral Development

Energy and mineral resources were evaluated from available geologic data supplemented by a limited amount of geochemical stream sediment sampling by TERRADATA, a consulting firm under contract with BLM. Technical details of the findings of the evaluation are found in a TERRADATA report titled "Assessment of Geology, Energy, and Minerals (GEM) Resources, North Fork Crooked River Geologic Resource Area". This report is supplemented by a BLM evaluation of the same area.

The WSA is within the North Fork Crooked River geologic resource are, which has been classified according to a rating system that indicates both the potential for occurrence (geologic favorability) of certain minerals, as well as the quantity and quality of data on which the rating is based (confidence level). A description of the rating system is provided in the Statewide EIS volume.

Oil and gas is the one potential energy resource in the area, and it has a high potential throughout the WSA based on several factors. Several deep exploratory wells have been drilled near the WSA, and all had oil and gas shows. They revealed that marine clastic sediments are present beneath the WSA. Other exploratory wells have been drilled within Central Oregon and all have had shows of hydrocarbons. The combination of surface structures, subsurface geology, hydrocarbon shows and presistent exploration efforts all lead to a high potential for oil and gas in the WSA.

As of January 1, 1984, the entire WSA was covered by 8 oil and gas leases and 6 oil and gas lease applications.

It is inferred that bentonites and zeolites occur in the west end of the WSA. A portion of the southwest corner of the WSA is rated moderately favorable for bentonite and zeolites.

There were no mining claims and no geothermal leases in the WSA as of January 1, 1984. There are no known mineral deposits in the WSA.

Table 3 shows the mineral potential classifications for the WSA. Map 4 shows the portion of the WSA rated moderate (medium) for bentonite and zeolites.

The WSA is encompassed by an area nominated as an area of critical mineral potential (ACMP). An ACMP is an area of existing or 'de facto' withdrawal (from mineral development) that was nominated by the public as having mineral potential that is important to the local, regional or national economy or that could become important in the future. ACMPs are used by BLM managers to reevaluate the withdrawals.

The exposed rocks in the WSA are Quaternary and Tertiary volcanics and volcaniclastic sediments. The subsurface rocks are inferred from oil and gas exploration wells to include Cretaceous marine clastic sediments and pre-Cretaceous marine clastic sediments and pre-Cretaceous marine sediments and metamorphosed sediments. Depth to these sediments varies from 1500 feet to 2500 feet.

Table 3. Classification of Energy and Mineral Potential, North Fork WSA (OR-5-31)

Commodity	Area	Classification Level	Confidence Level
Metals	Entire WSA	2	B
Diatomite	Entire WSA	2	C
Limestone	Entire WSA	2	C
Zeolites	See map 4	3	B
	Rest of WSA	2	C
Bentonite	See map 4	3	C
	Rest of WSA	2	C
Uranium/Thorium	Entire WSA	1	B
Geothermal	Entire WSA	1	C
Oil/Gas	Entire WSA	4	C
Sodium/Potassium	Entire WSA	2	B
Coal	Entire WSA	1	B
Tar Sands/Oil Shale	Entire WSA	1	B
Sand/Gravel	Entire WSA	2	C
Crushable Rock	Entire WSA	2	C

Legend:
Class 1 - Lack of indications of favorability
Class 2 - Low favorability
Class 3 - Moderate favorability
Class 4 - High favorability

Confidence Level A - Insufficient data or no direct evidence
Confidence Level B - Indirect evidence available
Confidence Level C - Direct evidence but quantitatively minimal
Confidence Level D - Abundant direct and indirect evidence

Vegetation

Vegetation within the North Fork WSA is as diverse as the topography. The rocky, shallow-soil ridges, which make up a large portion of the WSA, are dominated by either stiff or low sagebrush, with Sandberg's bluegrass, one spike danthonia, wild celery, and squirreltail grass comprising the understory. Idaho fescue and bluebunch wheatgrass are found on the deeper soils. Ponderosa pine is the dominant tree species but is generally restricted to the drainages. Douglas fir and white fir are found on north exposures. Western juniper is also present and dominates some sites, usually adjacent to ponderosa pine sites.

The potential climax vegetation of the ridges is generally Sandberg's bluegrass with varying amounts of Idaho fescue or bluebunch wheatgrass, one spike danthonia, and either stiff or low sagebrush. The potential climax vegetation of the ponderosa pine sites generally consists of an overstory of pine and varying amounts of bluebunch wheatgrass, Idaho fescue, and bitterbrush in the understory.

Vegetation of the WSA is generally mid-seral. (Seral refers to a stage of ecological condition based on the difference between the present plant community and climax vegetation, the relatively stable, final stage in plant succession.) About 65 percent of the WSA is in mid-seral, with the remainder split between late seral and early seral.

A plant species of special interest (mentioned in the Special Features section) that is suspected to occur in the WSA is Calochortus longebarbatus. This plant is a federal candidate species for Federal listing as threatened or endangered.

Wildlife

Game animals in the study area include mule deer, Rocky Mountain elk, antelope, ruffed and blue grouse, California valley quail, and mountain quail. Many furbearers, small mammals, and nongame birds are also found in the area. Habitat diversity is very high.

Stream riparian habitat within the study area totals approximately 55 acres of which 21 acres are rated in excellent habitat condition, 22 acres are good, 10 acres are fair, and 2 acres are poor.

Rainbow trout are found to some extent in all of the perennial streams. Within the WSA, bullhead and smallmouth bass are only found in the lower end of North Fork of the Crooked River due to the barrier presented by Lower Falls, which prohibits upstream movement of these fish. Many nongame fish species are also present, including sculpin, dace, squawfish and sucker.

The northern bald eagle, an occasional winter visitor, is federally listed as threatened in Oregon.

Existing wildlife projects in the WSA are approximately 9 miles of road closures completed in 1976. Proposed wildlife projects include 20 stream structures to improve fish rearing areas and pool/riffle ratios, 14 goose nesting platforms and 6.7 miles of streambank riprap to stabilize eroding stream channels.

Livestock Grazing

Portions of two grazing allotments lie within the North Fork WSA. Table 4 summarizes existing and potential livestock use in AUMs (animal unit months, the amount of forage needed to sustain one cow and a calf, or equivalent animals, for one month).

Existing livestock developments (among the man-made features listed in the Naturalness section) are 5.7 miles of fence, 3 reservoirs, 1 spring development, and 113 acres of seeding.

Proposed livestock developments in the WSA include 0.5 miles of fence, 1 reservoir, and 1 spring development. These projects are designed to aid livestock management and distribution and will permit a projected increase of 72 AUMs on public land within the WSA.

Gathering, moving and checking cattle in most of the WSA is done almost exclusively by horse. Most fence inspection and maintenance is also done on horseback. Major fence repair and inspection or repair of water developments is done by vehicle. Livestock operators make an estimated 20 to 30 trips per year into the WSA by vehicle to unload horses for checking cattle and livestock water supplies. Many of these trips are made during the hunting season when the potential for conflicts with other users of the public lands, especially hunters, is greatest.

Wood Products Harvest

Approximately 1,257 acres of commercial forest land have been identified within the North Fork WSA, with a total estimated volume of 8 million board feet (MMbf). Ponderosa pine is the primary species, although Douglas fir and white fir sometimes predominate in the north exposures of the draws.

The commercial forest land is managed on a custodial basis. Overmature, dying, and diseased trees are harvested periodically with salvage sales using existing roads and ways. The 8 MMbf within the WSA is not a part of BLM's annual programmed timber harvest. An estimated 5 to 10 board feet per acre could be harvested annually on this custodial basis.

Recreation Use

The North Fork WSA is very popular with recreationists who use motor vehicles, primarily hunters, fishermen, campers, and random off-road vehicle users. Recreationists who do not drive motor vehicles into the WSA use the area for hunting, fishing, backpacking, camping, day hikes, horseback riding and sightseeing. Wintertime activities include cross country skiing and snowshoeing. Vehicle-oriented hunting, fishing, and camping appear to be the predominant activities now occurring, and appear to be increasing at a slow rate.

Table 4. Existing and Potential Livestock Use, North Fork WSA (OR-5-31)

Grazing Allotment	Licensed AUMs in Allot.	Period of Use	Percent of Allot. in WSA (AUMs)	Current Actual Use in WSA (AUMs)	Potential Increase in WSA (AUMs)
N. Fork (No. 0053)	822	4/16-10/30	30	251	45
Rabbit Valley (No. 0050)	493	4/16-11/15	36	179	27
Total	1,315			430	72

Economic Value and Local Income

Resource outputs which generate economic activity in this WSA include livestock grazing, timber, and recreation. The entire area is under oil and gas leases or applications for leases. As of January 1, 1984, there were no geothermal leases on the WSA.

Economic value and local personal income generated from existing levels of resource outputs are presented in table 5. The terms economic value and local personal income are discussed in the Statewide EIS volume.

Environmental Consequences

This section discusses the environmental consequences of implementing each of the alternatives. Resources and activities not significantly affected by any of the alternatives are not discussed. General impact conclusions applicable to all WSAs, including impact conclusions based on speculative future developments (developments which are possible, but are not currently proposed), are discussed in the Statewide EIS volume. That volume also discusses certain assumptions that were made for this analysis.

Effects on Wilderness Values

Under the **all wilderness alternative**, all 10,745 acres of public land in the North Fork WSA would be added to the National Wilderness Preservation System (NWPS). The new wilderness unit would include 7 miles of the scenic canyon of the North Fork of the Crooked River and portions of the adjacent plateau. This alternative would preclude any new encroachment on the wilderness qualities that exist in the WSA. The private inholdings could be developed or used in ways which would adversely affect wilderness values on surrounding public lands, but there are no indications that owners intend to change the way they use the land. The land is now used in much the same way as surrounding public lands.

Table 5. Economic Value and Local Personal Income Generated Annually, Existing Program, North Fork WSA (OR-5-31) (1981 price levels)

Resource Output	Unit of Measure	Quantity	Economic Value	Local Personal Income Generated
Grazing	AUM	430	$3,242	$7,439
Recreation (incl. hunting)	RVD	Unknown	Unknown	Unknown
Timber	MBF	17	718	285
Oil & gas leases	Acres	10,745	10,745	3,236
Total			14,705	10,960

The elimination of vehicle use on the 19 miles of ways would enhance the area's naturalness by allowing disturbed areas to revegetate, and it would improve opportunities for solitude and primitive recreation.

Under the **enhanced wilderness alternative**, 11,465 acres would be added to the NWPS, assuming the 240 acres of adjacent state land and the 480 acres of private inholdings were acquired. Acquisition of the two private inholdings within the Crooked River Canyon would enhance wilderness characteristics and would substantially enhance solitude and primitive recreation opportunities by increasing the size of the wilderness. Closure of 1 mile of dead-end roads and 19 miles of ways would enhance the area's naturalness and improve opportunities for solitude and primitive recreation.

Under the **no wilderness/no action alternative**, any mineral development could adversely affect wilderness values, including the area's special wilderness features and opportunities for solitude and primitive recreation. Some adverse effects from oil and gas or geothermal lease development could be mitigated through lease stipulations. The likelihood for such development in the WSA depends on a mineral's potential for occurrence (oil or gas has a high potential for occurrence in this locale) and location and exploitability of other available sources outside the WSA.

Also, under the no wilderness/no action alternative, naturalness, opportunities for solitude and primitive recreation, and the special features within the WSA would be adversely affected in most of the WSA by vehicle-oriented recreation use.

Effects on Energy and Mineral Development

Areas designated wilderness would be withdrawn from mineral exploration and development: 10,745 acres under the **all wilderness alternative**; *and*

10,745 acres plus an additional 720 acres of state and private land if acquired as proposed under the **enhanced wilderness alternative**.

These withdrawals would include the area rated high for oil and gas and the area nominated as an ACMP, which encompass the entire WSA, and the 960-acre portion rated moderate for bentonite and zeolites.

No acreage would be withdrawn under the **no wilderness/no action alternative**.

Effects on Vegetation

Under the **all wilderness alternative**, mortality salvage of timber would cease, enhancing natural succession of all coniferous vegetation. Other vegetation types would not be affected.

Impacts of the **enhanced wilderness alternative** would be similar to the all wilderness alternative.

Under the **no wilderness/no action alternative**, vegetative succession stages would remain unchanged.

Effects on Wildlife

Fourteen waterfowl nest structures are proposed to improve nesting availability and reproduction of Canada geese. In addition, 20 stream structures are proposed to restore deteriorated habitat, by creating rearing areas and more favorable pool/riffle ratios. They would be constructed with hand labor only and designed to visually blend in with the immediate surroundings. A proposed streambank riprap project, using overlapping juniper trees, would provide stabilization of approximately 20 percent of the North Fork of the Crooked River stream channel which is presently eroding.

These projects might or might not be allowed under the **all wilderness alternative**, depending on a site-specific assessment of whether they would conform with Wilderness Management Policy.

The effect of the all wilderness alternative on wildlife would likely be an improvement in fish habitat and populations, and the maintenance of other wildlife values. Habitat diversity and big game populations would not change.

Impacts under the **enhanced wilderness alternative** would be similar to the all wilderness alternative.

Under the **no wilderness/no action alternative**, salvage logging on BLM land in the narrow stringers of timber would have no significant effect on wildlife. All wildlife projects would be allowed. The net effects of this alternative would be improvement in waterfowl habitat as well as fish habitat and populations.

Effects on Livestock Grazing

A fence, reservoir and spring development are proposed within the WSA. If constructed, the fence would improve management of both the North Fork and Rabbit Valley allotments by keeping livestock from crossing the river, the boundary between these allotments. The water developments would aid in better livestock distribution.

The projects which would allow this increase in AUMs through management might or might not be allowed under wilderness designation, depending on a site-specific assessment of whether they conform with Wilderness Management Policy. If not constructed, present management of these allotments would not be significantly affected. The projects have a benefit/cost ratio of less than 1:1.

The **all wilderness alternative** would have no effect on existing forage allocation. If the projects are not allowed, an opportunity to increase livestock forage by as much as 72 AUMs could be foregone.

A total of 19 miles of way would be closed under the all wilderness alternative, resulting in restricted use of vehicles for livestock management. Reservoir spring and fence maintenance by vehicle would be allowed if needed and if there were no practical alternative.

Under the **enhanced wilderness alternative**, impacts would be identical to those under the all wilderness alternative except in the case of access; a total of 1 mile of road and 19 miles of way would be closed.

Under the **no wilderness/no action alternative**, the fence, reservoir, and spring development would be constructed, as proposed, and the additional 72 AUMs would be realized.

Effects on Wood Products Harvest

The **all and enhanced wilderness alternatives** would preclude mortality salvage of timber within the WSA. This would result in foregoing harvest of approximately 11 Mbf annually.

Under the **no wilderness/no action alternative**, all 1,257 acres of BLM commercial forest land would continue to be managed with an annual production of 11 Mbf, solely from harvest as salvage.

Effects on Recreation Use

Under the **all wilderness alternative**, vehicle-oriented recreation would be eliminated on all access routes except the 1 mile of dead-end road segments. This would result in a substantial reduction in levels of vehicle-oriented recreation. This reduction would be partially offset by a moderate increase in primitive recreation. Overall, under this alternative, there would be a moderate net reduction in levels of recreation use. However, this reduction in use is expected to be displaced into other nearby areas. Some vehicle-oriented recreationists, primarily hunters, may continue to use the WSA, travelling by foot or horseback rather than vehicle. Others will find nearby areas where vehicle use is permitted.

Under the **enhanced wilderness alternative**, outstanding opportunities for primitive recreation would be improved by eliminating vehicles from a larger area. This would further decrease vehicle-oriented recreation. Impacts to overall recreation use would be the same as under the all wilderness alternative.

Under the **no wilderness/no action alternative**, recreation use would gradually increase, as it has in the past. Timber salvage, vehicle-oriented recreation

Table 6. Effects of Alternatives on Annual Economic Value, North Fork WSA (OR-5-31) (1981 price levels)

Item	Unit of Measure	All Wilderness	Enhanced Wilderness	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS				
Grazing:				
Investment[1]	AUM	0 to +72	0 to +72	+72
Waterfowl hunting[2]	RVD	0 to +129	0 to +129	+129
Reduced erosion[2]	$	0 to +3,350	0 to +3,350	+3,350
Resident fish reprod.[2]	$	0 to +4,250	0 to +4,250	+4,250
Timber	MBF	-11	-11	0
Oil & gas leases	Acres	-10,745	-11,465	0
VALUE OF PROPOSED INVESTMENTS[3]				
Grazing	$	0 to +503	0 to +503	+503
Waterfowl hunting	$	0 to +3,358	0 to +3,358	+3,358
Reduced erosion	$	0 to +3,100	0 to +3,100	+3,100
Resident fish reprod.	$	0 to +3,933	0 to +3,933	+3,933
Total[4]	$	0 to +10,894	0 to +10,894	+10,894
Investments[5]	$	0 to -1,867	0 to -1,867	-1,867
Net economic value	$	0 to +9,027	0 to +9,027	+9,027
VALUE OF OTHER EXPECTED CHANGES IN OUTPUTS				
Timber	$	-464	-464	0
Oil and gas leases	$	-10,745	-11,465	0
Reduced access[6]	$	-57	-57	0
Total	$	-11,266	-11,986	0
VALUE OF TOTAL EXPECTED CHANGES IN OUTPUTS				
All categories	$	-11,266 to -2,239	-11,986 to -2,959	+9,027

[1] Expected future increases due to range improvement investments.

[2] Expected future increases due to proposed structural wildlife projects.

[3] Structural projects involving up to $48,951, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

[4] Detail may not sum to "Total" due to rounding.

[5] Average annual cost of investment expenditures amortized at 7.875% over 50-year period.

[6] Additional cost (shown as negative value) due to restriction of vehicular access for livestock operator.

Table 7. Effects of Alternatives on Personal Income, North Fork WSA (OR-5-31) (1981 price levels)

Item	Unit of Measure	All Wilderness	Enhanced Wilderness	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS				
Grazing:				
Investment[1]	AUM	0 to +72	0 to +72	+72
Waterfowl hunting [2]	RVD	0 to +129	0 to +129	+129
Reduced erosion [2]	$	0 to +3,350	0 to +3,350	+3,350
Resident fish reprod. [2]	$	0 to +4,250	0 to +4,250	+4,250
Timber	MBF	-11	-11	0
Oil & gas leases	Acres	-10,745	-11,465	0
INCOME FROM PROPOSED INVESTMENTS [3]				
Grazing	$	0 to +1,245	0 to +1,245	+1,245
Waterfowl hunting	$	0 to +1,872	0 to +1,872	+1,872
Reduced erosion	$	Unknown	Unknown	Unknown
Resident fish reprod.	$	Unknown	Unknown	Unknown
Construction activity [4]	$	0 to +2,977	0 to +2,977	+2,977
Total [5]	$	0 to +3,117	0 to +3,117	+3,117
INCOME FROM ALL OUTPUT CHANGES				
Timber	$	-184	-184	0
Oil and gas leases	$	-3,236	-3,453	0
Total	$	-3,420	-3,637	0
INCOME FROM ALL OUTPUT CHANGES				
All categories [5]	$	-3,420 to -303	-3,637 to -520	+3,117

[1] Expected future increases due to range improvement investments.

[2] Expected future increases due to proposed structural wildlife projects.

[3] Structural projects involving up to $48,951, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

[4] Local personal income generated annually during assumed 5-year construction Period. This amount cannot be added to the income resulting from grazing and hunting activity because it is not sustained over the analysis period.

[5] Detail may not sum to "Total" due to rounding. Total omits income from construction which is limited to 5-year period. See footnote 4.

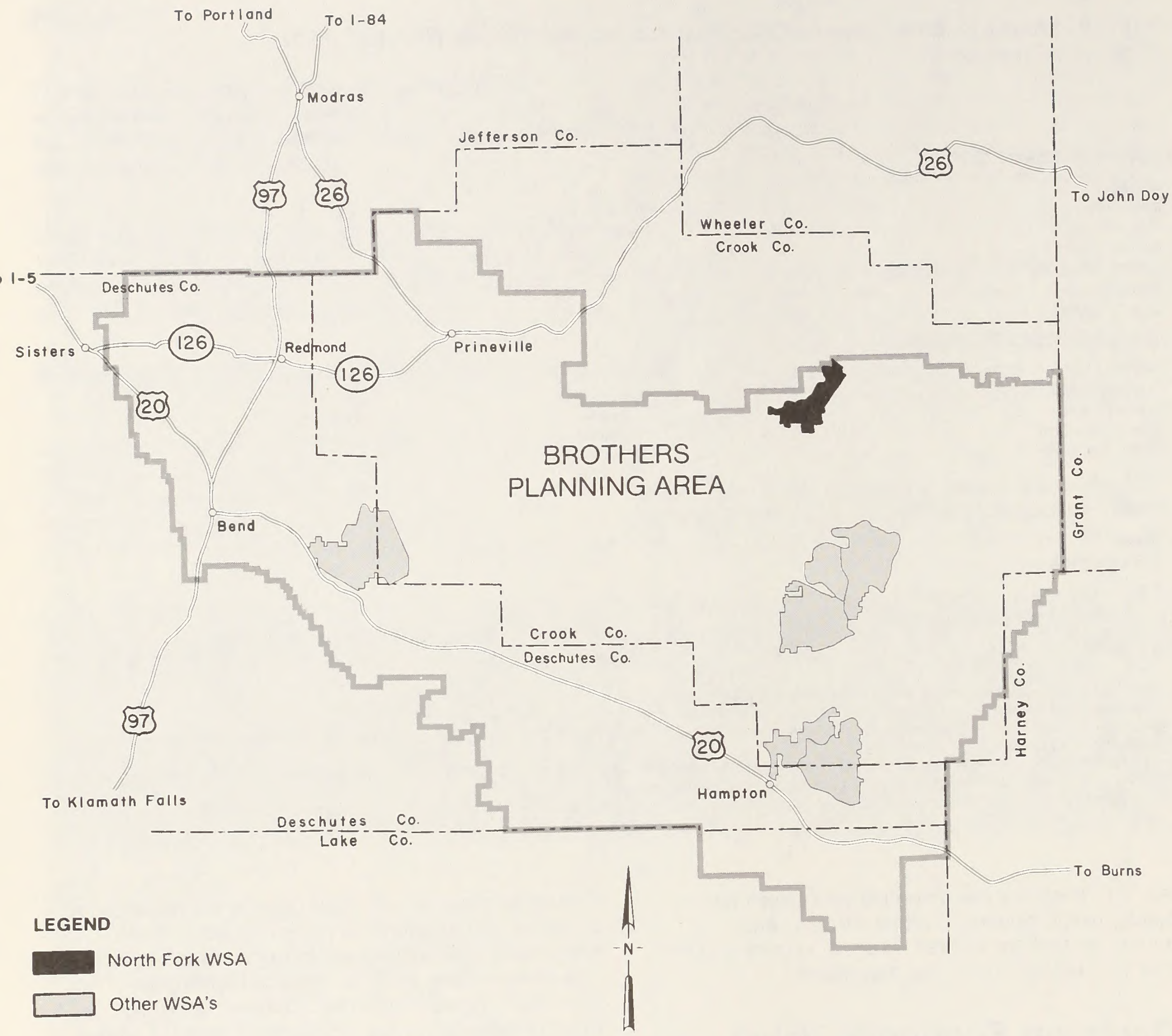
uses, and livestock maintanence and development projects, would adversely affect solitude and primitive recreation. Overall levels of recreation use would be highest under this alternative.

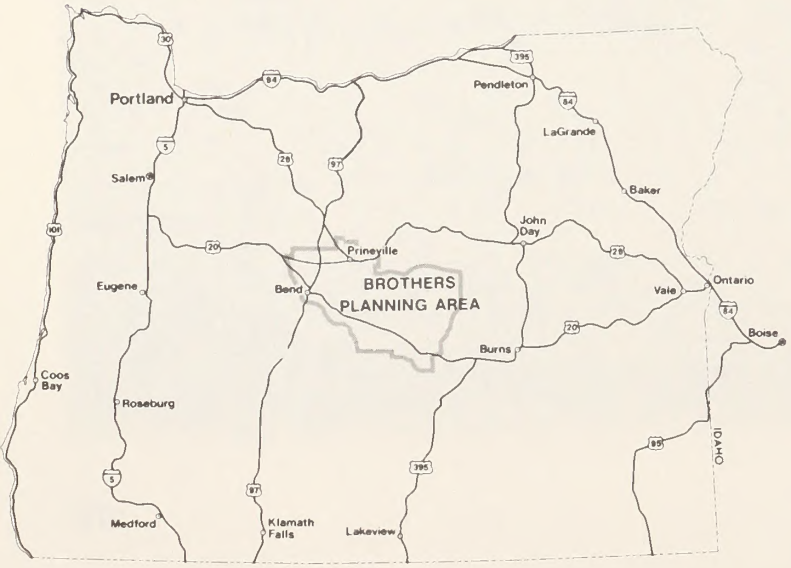
Effects on Economic Value and Local Income

Theeconomic effects of the alternatives are presented in tables 6 and 7. Table 6 shows the effects on economic value and table 7, the effects on local personal income. It is not known at this time whether individual proposed structural developments would be constructed if the area were designated wilderness. It is known that oil and gas operations and timber harvest would not be allowed.

The column for each wilderness alternative shows the effects as a range of values dependent upon whether proposed structural improvements were allowed.

Currently, there is little dependence on vehicles for livestock management in the study area. Both wilderness alternatives would restrict such vehicle use unless there were no practical alternative. The maximum impact from road closures upon the grazing operator in the WSA would be an increase in cost of about $57 per year.





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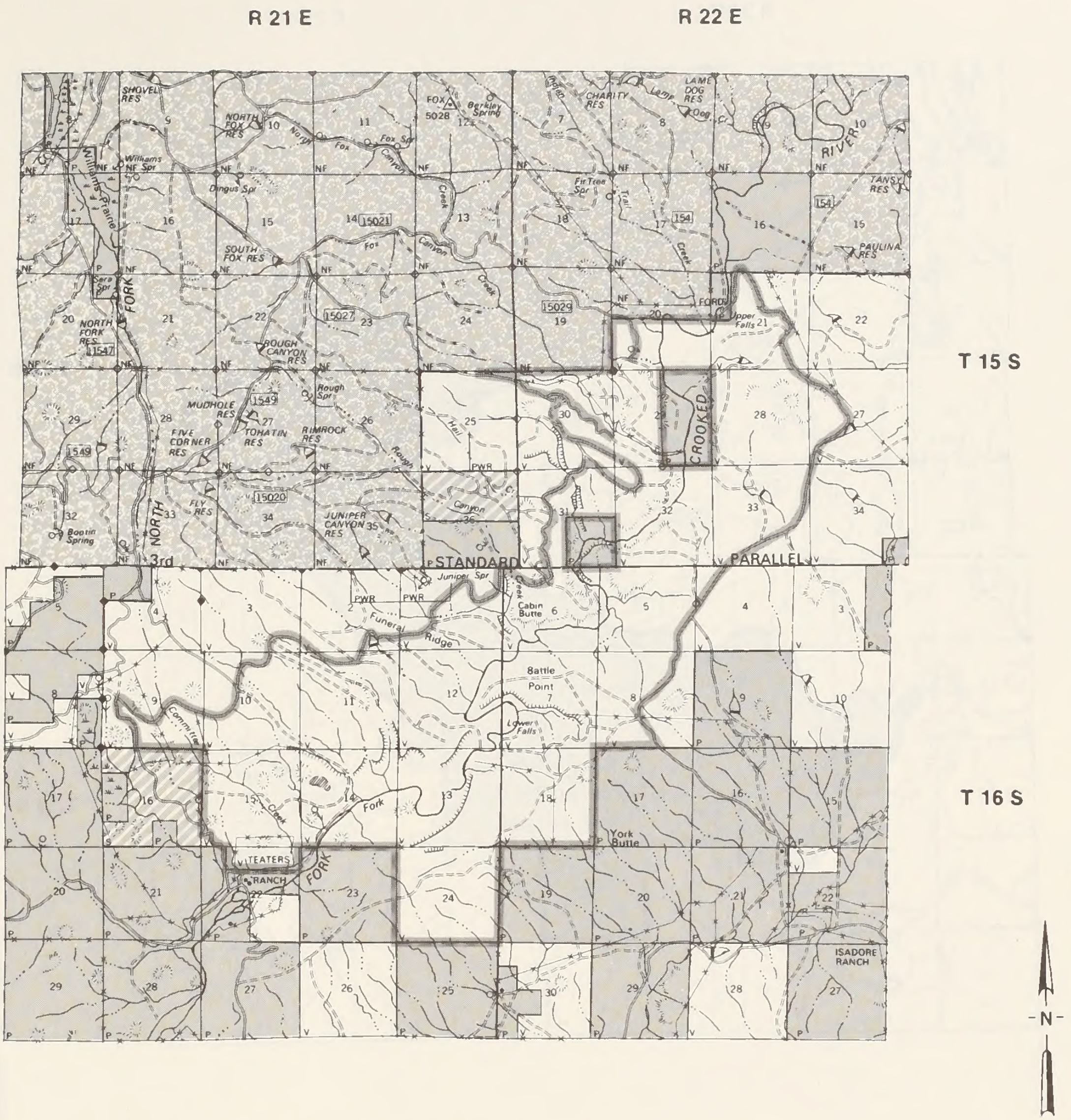
Bureau of Land Management
Prineville District

North Fork WSA
OR-5-31

LOCATION MAP

10 0 10 MILES

MAP 1



LEGEND

▬ Wilderness Study Area Boundary

☐ Bureau of Land Management

▨ State

▩ Private

▦ U.S. Forest Service

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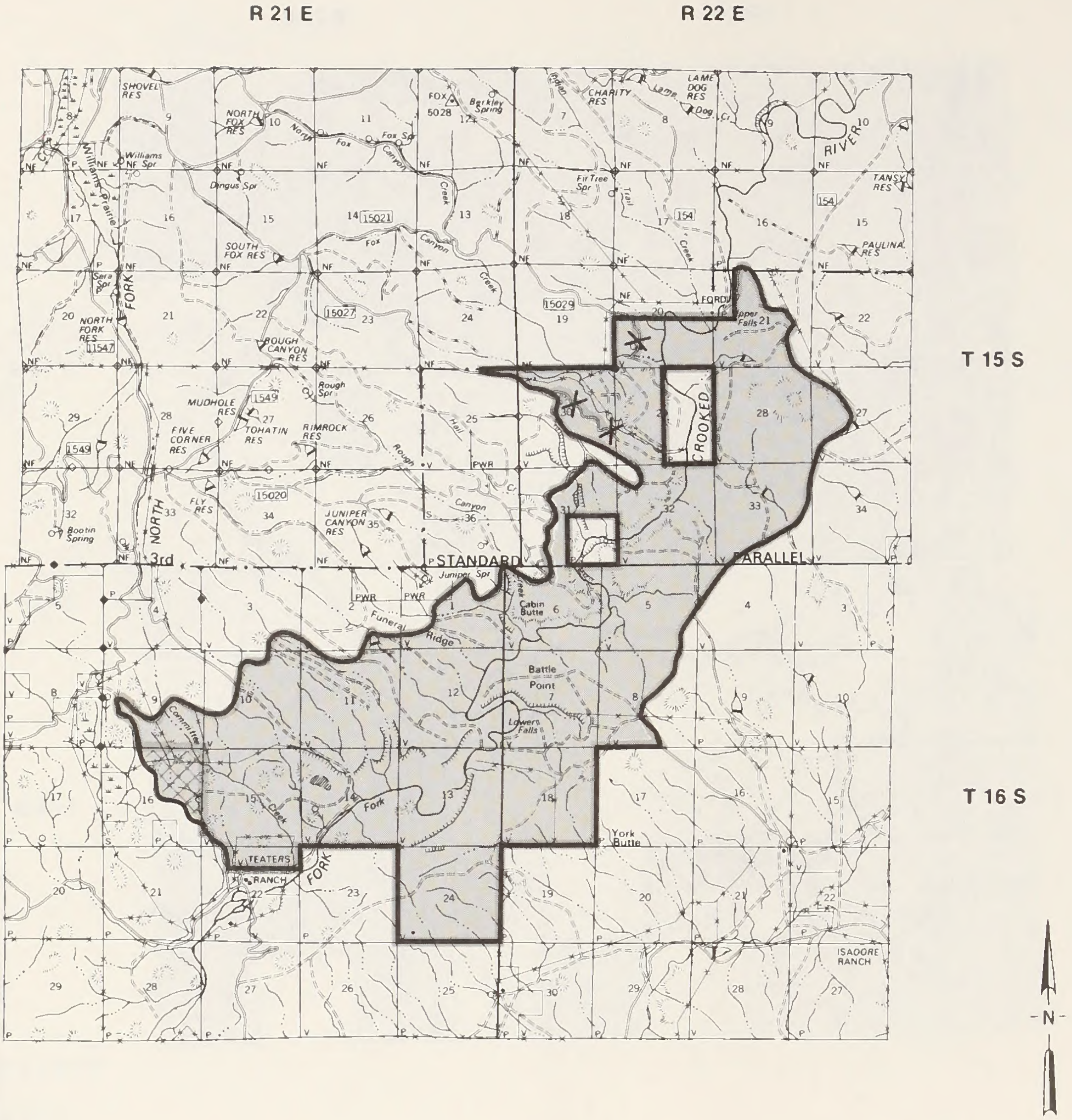
North Fork WSA
OR-5-31

LAND OWNERSHIP

1 0 1 2 MILES

MAP 2



LEGEND

▬ Wilderness Study Area Boundary

▭ Recommended Suitable for Wilderness

▨ Non-Federal Land within Recommended Wilderness

X X Recommended Road Closure

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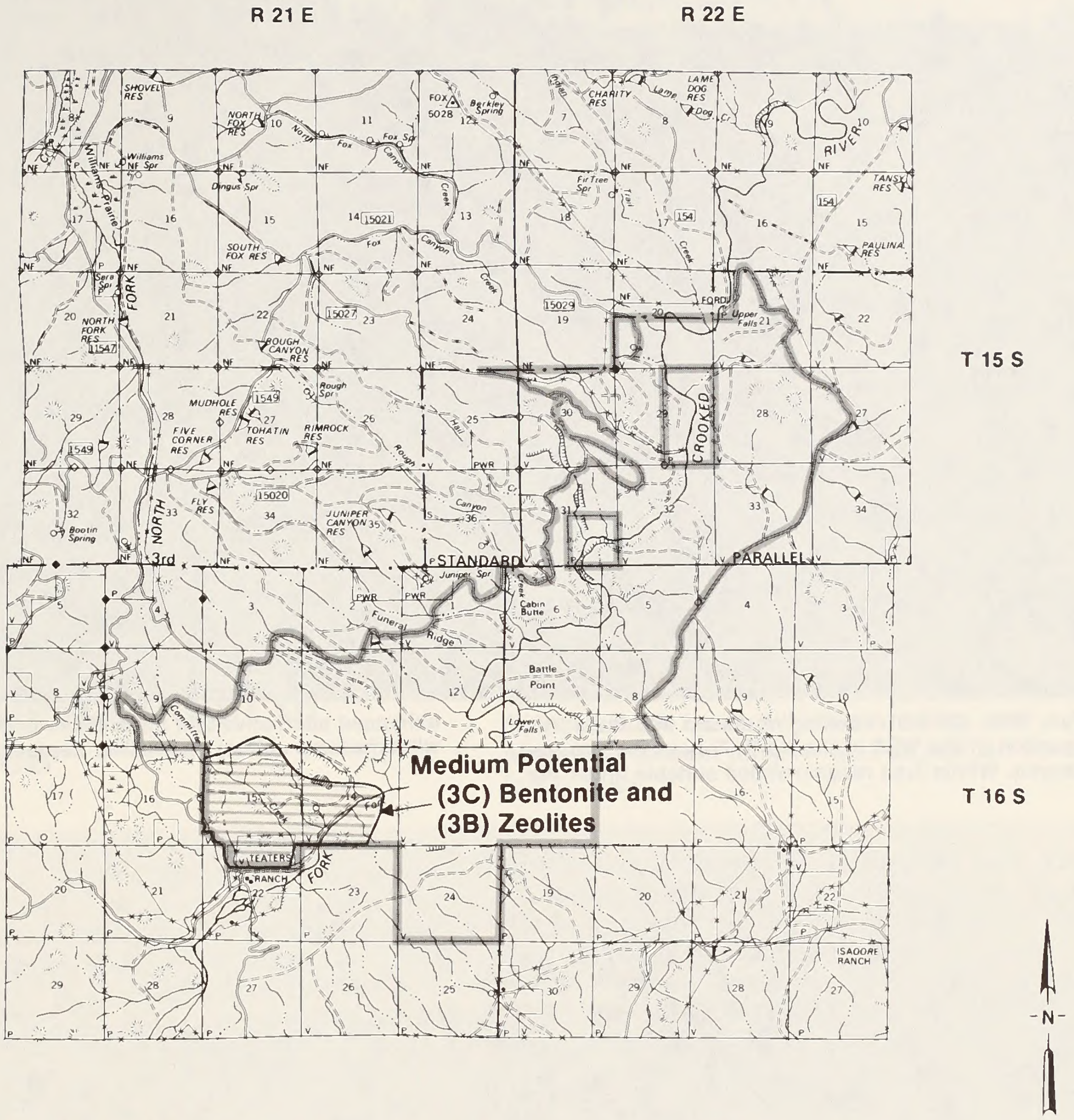
North Fork WSA
OR-5-31

ENHANCED ALTERNATIVE



Entire WSA:
High Potential
(4C) for Oil and Gas

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Prineville District

North Fork WSA
OR-5-31

MEDIUM OR HIGH POTENTIAL MINERAL OR ENERGY RESOURCES

1 0 1 2 MILES

MAP 4

North Fork WSA, OR-5-31. Looking northeast into the north-central portion of the WSA in the North Fork of the Crooked River Canyon. Within area recommended suitable under the enhanced alternative and nonsuitable under the preferred (no wilderness/no action) alternative. September 1979.

North Fork WSA, OR-5-31. Aerial view looking east in the east-central portion of the WSA (the background is outside of the WSA). Within area recommended suitable under the enhanced alternative and nonsuitable under the preferred (no wilderness/no action) alternative. Shows vehicle ways within the WSA. September 1979.

Appendix to the Wilderness Environmental Impact Statement for Oregon

South Fork (OR-5-33) and Sand Hollow (OR-5-34) Wilderness Study Areas

General Description of Study Area

The South Fork and Sand Hollow wilderness study areas (WSAs) are in Crook County, approximately 60 miles east of Bend, Oregon, and 170 miles southeast of Portland (see map 1). U.S. Highway 20 passes 20 miles to the south of the WSAs.

There are 19,391 acres of public land within the South Fork WSA and 8,091 acres within the Sand Hollow WSA. The South Fork WSA also has 440 acres of private inholdings (see map 2).

The South Fork WSA lies on both sides of the South Fork of the Crooked River and is roughly rectangular in shape, averaging about seven miles north to south and five miles east to west. The Sand Hollow WSA, immediately to the west and separated from the South Fork WSA by a BLM-maintained road, is generally round in shape, with the southern portion narrowing to a point. Private property and BLM- and county-maintained roads form the boundaries of these WSAs. Two dead-end roads, one in each WSA and totaling 2.1 miles, form part of the boundary.

The main features of the South Fork WSA are: the 700- to 800-foot-deep basalt canyon of the South Fork of the Crooked River; Pickett Canyon; and the open grassland of the Twelvemile Table mesa and Sulphur Butte areas, which are rolling and somewhat broken juniper- and sagebrush-covered landscapes.

In the Sand Hollow WSA, rolling hills extending in an east-west direction form part of Steens Ridge. There is a relatively open desert plateau in the central part of the Sand Hollow WSA. In the northern portion, there are Columbia River basalt escarpments interspersed with rolling desert topography. Vegetation is a big sagebrush/bunchgrass community. Juniper trees are scattered throughout the WSA.

The South Fork of the Crooked River is the only noteworthy water source in the South Fork WSA. A tributary of the Crooked River, it has average annual flows ranging from 15 cubic feet per second in late summer to 125 cubic feet per second during periods of spring runoff. Overall water quality meets state water quality standards. There are no perennial water sources within the Sand Hollow WSA.

Interrelationships

Another WSA, Gerry Mountain (OR-5-35) is located immediately to the southwest of both WSAs and is separated from them by a county road.

All of the South Fork and Sand Hollow WSAs fall within lands which were ceded to the U.S. Government by the Warm Springs Indian Tribe by ratified treaty. The treaty reserved rights to the Indians for hunting, fishing and gathering in usual and accustomed places and grazing stock on unclaimed lands.

Issues

Issues relating to each WSA were raised by BLM and the public during the wilderness inventory and EIS planning and scoping process. These issues concern both the effects of wilderness designation on existing and potential land uses or resources in the WSA, as well as the effects of existing and potential land uses or resources on wilderness values. Land uses or resources raised as issues specifically for these WSAs include:

- livestock projects and the use of vehicles for livestock management in the area, and

- existing oil and gas leasing and future exploration and development.

Description of the Alternatives

The following alternatives are analyzed:

- all wilderness
- enhanced wilderness (preferred alternative)
- no wilderness/no action

An opportunity exists to close the BLM-maintained road between the South Fork and Sand Hollow WSAs and manage them as a single unit if they were both designated as wilderness. This is analyzed in the enhanced wilderness alternative.

An alternative which would combine these two WSAs with the Gerry Mountain WSA by closing the county road is not analyzed; the road is an important local traffic route and closing it would not be feasible.

All Wilderness

Under the all wilderness alternative, all 19,391 acres of public land in the South Fork WSA and 8,091 acres of public land in the Sand Hollow WSA would be recommended suitable as wilderness and managed as separate wilderness areas (see map 2). Vehicle use would continue on the road separating the WSAs and on the 2.1 miles of dead-end roads in the WSAs. For purposes of analysis, it is assumed the private inholdings in the South Fork WSA would not be acquired.

Enhanced Wilderness (Preferred Alternative)

Under the enhanced wilderness alternative, a portion of the South Fork WSA (16,761 acres) would be combined with a portion of the Sand Hollow WSA (7,751 acres) to form a single wilderness area totaling 24,512 acres (see map 3). In addition, an attempt would be made to acquire 80 acres of private land in the canyon of the South Fork of the Crooked River. (Acquisition of other private inholdings would not significantly enhance wilderness values.) This parcel could be acquired through purchase or exchange with willing landowners.

Assuming acquisition of this parcel, a total of 24,592 acres would be recommended suitable under this alternative.

The 6 miles of road between the WSAs would be closed, and .6 miles of dead-end roads within the WSAs would also be closed.

Recommended nonsuitable as wilderness would be 340 acres in Sand Hollow WSA located west of the rimrock which forms Steens Ridge and adjacent to the Camp Creek road; this area contains an old crested wheatgrass seeding. The rimrock would form the boundary of the suitable area. Also recommended nonsuitable would be a 2,630-acre area in the northern portion of South Fork WSA. The area contains 21 active mining claims and has a high potential for semiprecious stones. The boundary in this area would follow a surveyed line separating the area with the mining claims from the remainder of the WSA.

Manageability of both WSAs as wilderness would be enhanced by excluding the nonsuitable areas from the wilderness.

No Wilderness/No Action

The no wilderness/no action alternative would recommend both WSAs nonsuitable as wilderness. It represents the situation most likely to occur without wilderness designation. The area would be managed according to the current land use plan, which includes the following features relevant to this analysis:

- implementation of livestock development projects (including juniper control, reservoirs, and brush control through burning),
- construction of wildlife projects (including stream rip rap, nest structures, guzzlers (small wildlife watering devices) and prescribed burning),
- continued use of motorized vehicles, and
- continued availability for mineral exploration and development, including possible increased mining as well as oil and gas exploration and development.

Table 1 summarizes the proposed management of the WSA under each alternative.

Table 2 summarizes the environmental consequences of each alternative.

Manageability of the Areas as Wilderness

Both areas would be manageable as wilderness under the all wilderness and enhanced wilderness alternatives. However, problems could be encountered in managing two portions of the areas.

Currently, private inholdings do not affect the areas' manageability. Three separate private inholdings in the South Fork WSA, totaling 440 acres, are used for livestock grazing. Landowners have not expressed interest in changing the use of the land, and it does not appear likely that land use will change in the foreseeable future; however, this could change at the discretion of the owners.

There are 21 active mining claims located in the northern portion of the South Fork WSA. The extraction of semiprecious stones, primarily limb casts, has caused some surface disturbance. No structures or other developments are present. A moderate amount of mining activity has occurred. These claims create a significant manageability problem. Twelve mining claims, all inactive, exist in two portions of the Sand Hollow WSA.

Table 1. Summary of Proposed Management Under Each Alternative, South Fork (OR-5-33) and Sand Hollow (OR-5-34) WSAs

Proposed Management	All Wilderness	Enhanced Wilderness	No Wilderness/ No Action
Acres Designated as Wilderness	27,482	24,512	0
Acres Closed to ORVs by Wilderness Designation	27,482	24,512	0
Miles of Roads Closed	0	6.6	0
Miles of Ways Closed	13.4	13.4	0
Acres of Full Fee Estate Acquired[1]	0	80	0
Acres Withdrawn from Mineral Location and Leasing by Wilderness Designation	27,482	24,512	0
Structural Wildlife Projects Developed: Catchments and Guzzlers (number)	0-3	0-3	3
Stream Channel Projects (number) [2]	0-2	0-2	2
Nest Structures	0-35	0-35	35
Vegetative Manipulation for Wildlife: Brush Control Without Seeding (acres)	0	0	2,520
Structural Livestock Projects Developed: Reservoirs & Waterholes (number)	0-5	0-5	5
Fences (miles)	0-1.9	0-1.9	1.9
Vegetative Manipulation for Livestock: Brush Control Without Seeding (acres)	0	0	1,280
Juniper Control Without Seeding (acres)	0	1,390	2,190
Unallocated Existing Forage Allocated (AUMs)	0-578	0-578	578

[1] Upon acquisition, these additional lands would be incorporated into the wilderness area, closed to vehicle use, and withdrawn from mineral location and leasing.

[2] One stream project involves placement of 60 stream structures; the other involves riprap treatments over a 2.5 mile length of river.

If the mining claimants had valid discoveries by the time the area was designated wilderness and had developed their claims, the resulting surface disturbance would adversely affect both naturalness and solitude in those portions of the study areas. Extraction of semiprecious stones by mechanical equipment in the South Fork WSA has not had a substantial impact on wilderness characteristics (less than one acre has been disturbed). However, this activity could diminish wilderness characteristics over a substantial area.

It could be difficult to manage a 340-acre area along the west boundary of the Sand Hollow to preserve its wilderness values. The area is seeded

Table 2. Summary of Environmental Consequences of Alternatives, South Fork (OR-5-33) and Sand Hollow (OR-5-34) WSAs

Resource or Activity	All Wilderness	Enhanced Wilderness (Preferred Alternative)	No Wilderness/No Action
Wilderness Values	Would add 19,391 acres in South Fork WSA and 8,091 acres in Sand Hollow WSA to NWPS as separate wilderness areas. Would preserve the Canyons of S. Fork of the Crooked River, Twelvemile Table, Sulphur Butte, Steens Ridge, and wilderness values throughout the area, including crucial deer winter range and northern bald eagle habitat. Both areas are manageable as wilderness. However, it could be difficult to manage the northern portion of the South Fork WSA where existing mining claims could be developed (if they are found to be valid). 13.4 miles of ways would revegetate, and area would be more natural.	Would combine portions of both WSAs, and add 24,592 acres to NWPS, assuming 80 acres private inholdings could be acquired. Similar to the effects of all wilderness except that mining claims in north would not be a management problem because that area would not be designated wilderness. Wilderness values on these lands and in 340 acre area recommended nonsuitable in Sand Hollow could be impaired by mining oil and gas development and other types of development. Closure of road separating the South Fork and Sand Hollow WSAs, as well as dead-end roads and 11 miles of ways within the two WSAs, would enhance wilderness values. Acquisition of inholdings would preclude types of development which could impair wilderness values. The combined area would be manageable as wilderness.	Wilderness characteristics such as nauturalness, solitude and primitive recreation would be adversely affected by juniper and brush control, other wildlife/livestock improvement projects and by vehicle-oriented recreation use. Mining and oil and gas development could also occur. If such developments did occur, wilderness values would be impaired. Vehicle traffic would adversely affect opportunities for solitude and primitive recreation.
Energy and Mineral Development	Development precluded on 19,391 acres and 8,091 in the South Fork and Sand Hollow WSAs, respectively, including area with high potential for oil and gas (entire WSAs); 1,800 acres in South Fork with high potential for semi-precious gem stones; and 540 acres in Sand Hollow with high potential for bentonite and zeolites.	Development precluded on 24,512 acres, plus an additional 80 acres,if acquired. All of this has high potential for oil and and gas.	No impact.
Vegetation	Vegetation preserved. Acceleration of ecological succession on 30% of South Fork WSA if fence for livestock grazing built.	Vegetation preserved in suitable portions.	In South Fork WSA, 2,760 acres of brush control (livestock and wildlife) and 2,190 acres of juniper control would reduce vegetation diversity. Fencing would allow improved management and accelerate succesion. In Sand Hollow WSA, brush control on 1,040 acres would reduce vegetation diversity.
Wildlife	Wildlife habitat preserved. In South Fork WSAs, wildlife projects to increase fish populations, wildlife distribution, and nesting availability for Canada Geese may be precluded. In Sand Hollow WSA one proposed guzzler might not be installed, affecting wildlife distribution.	Wildlife habitat preserved in suitable area. Effects of proposed projects on wildlife same as under all wilderness alternative.	All wildlife improvement projects allowed, resulting in greater habitat diversity, increased fish populations and increased Canada Goose nesting in South Fork WSA.
Livestock Grazing	As much as 941 AUMs foregone in South Fork WSA, due to projects which may not be allowed. As much as 323 AUMs foregone in Sand Hollow WSA. Some vehicle restrictions could have slight effect on livestock management in both WSAs.	As much as 1,149 AUMs foregone in both WSAs. Additional restrictions on use of vehicles in both WSAs.	No impact. An increase of 941 AUMs in South Fork WSA and 323 AUMs in Sand Hollow WSA realized.

Recreation Use	Opportunities for primitive recreation would increase, especially in the South Fork WSA. A substantial reduction in vehicle-oriented recreation use by hunters and rockhounds would be partially offset by a slight increase in primitive recreation. Vehicle-oriented recreation displaced to other nearby areas. Moderate net decrease in overall recreation use.	Similar to all wilderness, except road closures would eliminate vehicle-oriented recreation use by hunters. Would enhance wilderness values and primitive recreation. This would offset decreases in vehicle-oriented recreation use that would occur with the road closures. Small net decrease in overall recreation use.	Proposed development activities would reduce opportunities for primitive recreation. Vehicle-oriented recreation levels would continue to increase. No net change in overall recreation.
Economic Value and Local Income	Changes in annual economic value could range from a loss of $27,632 to $9,755 depending on what investments and grazing increases would be allowed in wilderness. Local personal income would decrease by $8,277 or increase by $16,145 depending on the same uncertain factors. Both sets of figures include loss of oil and gas leases and exclude unknown economic effects of mineral development and and unquantified changes in recreation use. The maximum increase in transportation costs to livestock operators would be $150.	Changes in annual economic value could range from a loss of $25,003 to $7,577 depending on what investments and grazing increases would be allowed in wilderness. Local personal income would decrease by $5,292 or increase by $17,988 depending on the same uncertain factors. Both sets of figures include loss of oil and gas leases and exclude unknown economic effects of mineral development and unquantified changes in recreation use. The maximum increase in transportation costs to livestock operators would be $293.	Increase in annual economic value and local personal income by $16,733 and $26,948, respectively from construction of proposed projects.

to crested wheatgrass, and it might be necessary to reseed it to maintain livestock operations. If that were the case, wilderness values would be reduced.

Rationale for Selection of the Preferred Alternative

The enhanced wilderness alternative is preferred because the benefits of preserving wilderness values on the majority of the area would outweigh the benefits of maintaining options for development of minerals and other resources.

Both the South Fork and Sand Hollow WSAs are generally free of human developments and appear to have been affected primarily by the forces of nature. With the exception of the northern portion of the South Fork WSA, totaling 2,630 acres, and 340 acres along the western boundary of the Sand Hollow WSA, there would be few problems in managing the areas to preserve their wilderness values. The existing ways and range developments within the combined area recommended as suitable for wilderness are substantially unnoticeable because they are reverting to a natural condition. Excellent topographic and vegetative screening also shield them from view. Opportunities for solitude and primitive types of recreation are outstanding in several locations within these WSAs.

These values would be significantly enhanced by combining the WSAs and closing approximately six miles of boundary road between them. The resulting area would provide a unique wilderness opportunity encompassing a variety of landscapes ranging from a dry, windswept plateau to rolling juniper hills to a rugged basalt canyon accented by the South Fork of the Crooked River.

Closing the road between the two WSAs and designating a larger wilderness area would enhance the naturalness of the area and increase opportunities for solitude and primitive recreation.

After completion of BLM's Brothers Management Framework Plan in 1979, new minerals data became available. These data indicate a high potential for semiprecious stones for the northern portion of the South Fork WSA. In light of the 21 existing mining claims in this area, it might be difficult to manage this portion of the area to preserve wilderness values. In order to enhance manageability of the WSA, the 2,630-acre area containing the mining claims and highest minerals potential would be recommended as nonsuitable. This area also has been determined to have high potential for oil and gas development, and recommending this portion of the area as nonsuitable for wilderness retains the options for oil and gas exploration and development.

A 340-acre area containing a crested wheatgrass seeding along the west boundary of the Sand Hollow WSA would be recommended as nonsuitable because its naturalness is limited and because it would be difficult to manage the area to preserve the limited wilderness values in the area if it were necessary to reseed it to maintain livestock grazing operations. Wilderness values in that portion of the area also are impaired by the sights and sounds of traffic on the road which forms the boundary of the WSA.

Affected Environment

This section discusses only those activities or resources that influence the character of the study area, or that may be affected by the alternatives.

Wilderness Values

Naturalness

Both areas are in an essentially natural condition and appear to be primarily affected by the forces of nature. Minor man-made features are dispersed throughout various parts of the WSAs. The features in the South Fork WSA include 14.1 miles of fence, 13 reservoirs and spring developments, 780 acres of crested wheatgrass seeding, and 9.4 miles of ways. In the Sand Hollow WSA they include 7.5 miles of fence, 6 reservoirs, 320 acres of seeding, 1,000 acres once sprayed to reduce sagebrush, and 4 miles of ways. Some ways are reverting back to a natural appearing condition.

A limited amount of mining has occurred on some of the claims in the South Fork WSA. The area of disturbance is not significant.

About 11 percent of the two WSAs are influenced to varying degrees by man-made features. (The area of influence is an estimate of the acreage within the WSA from which these features can be seen.) The cumulative effect of these imprints is minimal due to the scale of the development, the size of the area, topographic and vegetative screening, the reverting of treated areas to a natural appearing condition, and the dispersal of the developments.

A large area seeded with crested wheatgrass on the west side of the Sand Hollow WSA and vehicle traffic (averaging 28 vehicles per day) on the Camp Creek Road on the WSA's western boundary are outside sights and sounds which reduce the quality of naturalness in the Sand Hollow WSA. There are no noteworthy outside sights or sounds that encrouch on the South Fork WSA.

Opportunities for Solitude or Primitive and Unconfined Types of Recreation

The South Fork WSA has outstanding opportunities for solitude because of its size, shape, and topographic and vegetative screening. Opportunities to find a secluded spot are available in three distinct portions of the area: the canyon of the South Fork of the Crooked River, Twelvemile Table, and the Sulphur Butte area.

Outstanding opportunities for several types of primitive and unconfined recreational activities are available within this WSA: backpacking, camping, photography, nature study, hunting, fishing and horseback riding. An outstanding recreational activity is a hike along the meandering bottom of the South Fork of the Crooked River Canyon, where the feeling of solitude is strong.

The canyon's impressive geologic formations add to the scenic beauty and diversity of the WSA. Several side canyons such as Pickett Canyon also enhance the opportunity to hike and explore.

Although the Sand Hollow WSA is relatively small, it has outstanding opportunities for solitude due to dense clusters of juniper trees in some portions of the area, along with its shape and topography. Opportunities to find a secluded spot are available in the vicinity of Steens Ridge, in the central portion of the WSA.

Several primitive and unconfined types of recreational activities are available in the WSA. These include hiking, camping, hunting, photography, nature study, sightseeing, and horseback riding. However, they are not outstanding due to a limited amount of diversity in wildlife, topography and vegetation. There are no unique points of interest to attract visitors to this area, or physical challenges available to visitors seeking this type of experience.

Special Features

While not geologically unique, the canyon of the South Fork of the Crooked River, including Pickett Canyon, contains outstanding scenery and is unique in this area. The steep, narrow, rugged canyon is noteworthy in this area dominated by rolling hills and wide expanses. The northern bald eagle, which is federally listed as threatened in Oregon, is also an occasional winter visitor to the area.

Crucial deer winter range covers the western portion and the northeastern portion of the South Fork WSA and also 3,400 acres in the eastern half of the Sand Hollow WSA.

Diversity in the National Wilderness Preservation System (NWPS)

According to the Bailey/Küchler system of classifying ecosystems, the WSAs are located in the Intermountain Sagebrush Province and the potential natural vegetation is sagebrush steppe and sagebrush steppe with juniper. Of the vegetative communities listed in the High Lava Plains and Columbia Basin section of the Oregon Natural Heritage Plan, the following occur in the WSAs: western juniper/big sagebrush/bluebunch wheatgrass; big sagebrush/blue bunch wheatgrass; low sagebrush/Idaho fescue; and western juniper/bluebunch wheatgrass (South Fork WSA only.)

There are seven standard metropolitan statistical areas within 5 hours' driving time of the WSAs: Eugene/Springfield, Medford, Portland and Salem, Oregon; Richland/Kennewick/Pasco and Yakima, Washington; and Boise, Idaho.

Energy and Mineral Development

Energy and mineral resources were evaluated from available geologic data supplemented by a limited amount of geochemical stream sediment sampling by geologists with TERRADATA, a consulting firm under contract with BLM. Technical details of the findings of the evaluation are found in a TERRADATA report titled "Assessment of Geology, Energy, and Minerals (GEM) Resources, Gerry Mountain Geologic Resource Area." This report is supplemented by a BLM evaluation of the same area.

The WSAs are within the Gerry Mountain geologic resource area, which has been classified according to a rating system that indicates both the potential for occurrence (geologic favorability) of certain minerals, as well as the quantity and quality of data on which the rating is based (confidence level.) A description of the rating system is provided in the Statewide EIS volume.

Oil and gas has a high potential based on several positive factors. Two deep exploratory wells have been drilled near the WSAs. Both had oil and gas shows and they revealed that marine clastic sediments are present beneath both WSAs. Other exploratory wells have been drilled within Central Oregon and all have had hydrocarbon shows. The combination of surface structures, subsurface geology, hydrocarbon shows and persistent oil and gas exploration efforts all lead to a high potential for oil and gas in the South Fork and Sand Hollow WSAs. Both WSAs were covered by oil and gas leases as of January 1, 1984.

Table 3 shows the mineral potential classifications for the WSA. Map 5 shows the portions rated moderate (medium) for bentonite, zeolites, and semiprecious stones.

Both WSAs are within an area of critical mineral potential (ACMP), because of the oil and gas potential. An ACMP is an area of existing or 'de facto' withdrawal from mineral development that was nominated by the public as having mineral potential important to the local, regional, or national economy, or that could become important in the future. ACMPs are used by BLM to reevaluate the withdrawals.

There are known deposits of semiprecious gemstones (limbcasts) within the South Fork WSA. As of January 1, 1984, 21 mining claims cover

Table 3. Classification of Energy and Mineral Potential, South Fork (OR-5-33) and Sand Hollow (OR-5-34) WSAs

Commodity	Area	Classification Level	Confidence Level
Metals	All of both WSAs	2	B
Diatomite	All of both WSAs	2	C
Limestone	All of both WSAs	2	C
Zeolites	Part of Sand Hollow only*	4	C
	Rest of area	2	C
Bentonite	Part of Sand Hollow only*	4	C
	Rest of area	2	C
Semiprecious	Part of South Fork only*	4	D
	Rest of area	2	B
Uranium/Thorium	All of both WSAs	2	B
Geothermal	All of both WSAs	1	C
Oil/Gas	All of both WSAs	4	C
Sodium/Potassium	All of both WSAs	2	B
Coal	All of both WSAs	1	B
Tar Sands/Oil Shale	All of both WSAs	1	B
Sand/Gravel		2	C
Crushable Rock	All of both WSAs	2	C

*See map 5

Legend:
Class 1 - Lack of indications of favorability
Class 2 - Low favorability
Class 3 - Moderate favorability
Class 4 - High favorability

Confidence Level A - Insufficient data or no direct evidence
Confidence Level B - Indirect evidence available
Confidence Level C - Direct evidence but quantitatively minimal
Confidence Level D - Abundant direct and indirect evidence

these deposits and are currently being developed by the claimants. In the western portion of the Sand Hollow WSA, there are known deposits of bentonite and zeolites. There were 12 mining claims, as of January 1, 1984, for semiprecious stones in the Sand Hollow WSA. However, all of the claims are inactive and no known deposits exist in the area.

The exposed rocks in the WSAs are Quaternary and Tertiary volcanics and volcaniclastic sediments. The subsurface rocks are inferred from oil and gas exploration wells to include Cretaceous marine clastic sediments and pre-Cretaceous marine sediments and metamorphosed sediments. Depth to these sediments varies from 1500 feet to 2500 feet.

Vegetation

Vegetation within the South Fork WSA consists of sagebrush/bunchgrass and juniper/sagebrush plant associations. Sagebrush/bunchgrass dominates the Twelvemile Table area in the eastern part of the South Fork WSA with low sagebrush and Idaho fescue the major species. Vegetation of the WSA is late seral. (Seral refers to a stage of ecological condition based on the difference between the present plant community and climax vegetation, the relatively stable, final stage in plant succession.)

The Sand Hollow WSA and the western part of the South Fork WSA are generally in mid-seral stage, and contain both sagebrush/bunchgrass and juniper/sagebrush/bunchgrass plant communities. Low sagebrush and either Idaho fescue or bluebunch wheatgrass dominate the table land adjacent to the South Fork of the Crooked River, while western juniper, big or low sagebrush, and Idaho fescue or bluebunch wheatgrass are found in the hilly areas to the north and west.

Riparian vegetation is present along the South Fork of the Crooked River in the South Fork WSA. Plants include Kentucky bluegrass, American brooklime, and cinquefoil, which are almost entirely in early- to mid-seral stage.

The potential climax vegetation of the WSAs is generally either Idaho fescue or bluebunch wheatgrass. Western juniper and sagebrush are generally considered invader species here, although some climax juniper sites are present in South Fork and Pickett canyons where fire or livestock grazing have not been major factors in community development.

Wildlife

Game animals in the WSAs include mule deer, antelope, upland game birds and waterfowl. Many fur bearers, small mammals and birds inhabit the area.

In the South Fork WSA, crucial deer winter range supports approximately 300 deer. Crucial deer winter range supports approximately 60 deer in the Sand Hollow WSA.

Stream riparian habitat within the South Fork WSA is in fair condition. There is no riparian habitat in the Sand Hollow WSA.

The northern bald eagle, which is federally listed as threatened in Oregon, is an occasional winter visitor in the South Fork WSA. No critical habitat for this species has been identified in the study area.

Proposed wildlife projects within the South Fork WSA are: sixty stream structures to improve fish rearing habitat, 2.5 miles of stream riprap, 35 waterfowl nest structures in juniper trees, 2 wildlife guzzlers to enhance mule deer habitat and 2,520 acres of prescribed burning for brush control. One wildlife guzzler is proposed within the Sand Hollow WSA.

Livestock Grazing

Portions of four grazing allotments lie within the South Fork WSA, and portions of two allotments lie within the Sand Hollow WSA. Table 4 summarizes existing and potential livestock use in AUMs (animal unit months, the amount of forage needed to sustain one cow and a calf, or equivalent animals, for one month).

Existing livestock developments (among the man-made features listed in the Naturalness section) include 14.1 miles of fence, 13 reservoirs and spring developments, and crested wheatgrass seeding in the South Fork WSA, and 7.5 miles of fence, 6 reservoirs and brush control followed by a seeding in the Sand Hollow WSA.

Livestock developments proposed within the South Fork WSA include 1.9 miles of fence, 3 reservoirs, 240 acres of brush control through burning, and 2,190 acres of juniper control. Proposed in the Sand Hollow WSA are 2 reservoirs and 1,040 acres of brush control through burning.

Through these developments, an additional 317 AUMs of livestock forage in the South Fork WSA and 153 AUMs in the Sand Hollow WSA are planned in the long term, with 216 additional AUMs produced through management, such as rest rotation grazing systems, in the South Fork WSA.

In addition, a total of 408 AUMs of livestock forage in the South Fork WSA and 170 AUMs of livestock forage in the Sand Hollow WSA is currently available but has not yet been allocated. Existing land use plans propose to allocate this forage to livestock use.

Livestock operators primarily use horses in gathering, moving, and checking the cattle. Developments are also inspected on horseback, although operators frequently use motor vehicles along established ways to check reservoirs and springs. Maintenance of all developments except fences requires motor vehicles to transport material and equipment. Fences are generally maintained annually via horseback; major repairs require vehicles. Operators probably make an annual total of between 10 and 15 trips via motorized vehicle into the South Fork WSA and 5 to 10 trips into the Sand Hollow WSA for livestock management.

Recreation Use

The South Fork WSA is a popular area with recreationists, primarily hunters and rockhounds, who use vehicles as as part of their recreation activity; it is also popular with day hikers and backpackers. With the exception of rockhounding, the Sand Hollow WSA receives the same kinds of recreation use as the South Fork WSA; however, levels of use are lower than in South Fork WSA. Vehicle-oriented recreation, primarily rock hounding

Table 4. Existing and Potential Livestock Use, South Fork (OR-5-33) and Sand Hollow (OR-5-34) WSAs

Grazing Allotment	Licensed AUMs in Allot.	Period of Use	Percent of Allot. in WSA	Current Actual Use in WSA (AUMs)	Potential Increase in WSA (AUMs)	Available But Unallocated Forage
South Fork WSA						
Camp Creek Community (No. 0064)	1,122	4/16-10/31	42	405	304	65
Cold Springs (No. 0009)	2,554	4/16-10/31	2	33	8	8
Dagis Lake (No. 0056)	868	5/01-09/30	53	260	88	202
Lister (No. 0047)	2,164	4/01-10/31	25	531	133	133
Total South Fork	7,158			1,229	533	408
Sand Hollow WSA						
Cold Springs (No. 0009)	2,554	4/16-10/31	11	234	52	45
Dagis Lake (No. 0056)	868	5/01-09/30	33	158	101	125
Total Sand Hollow	3,422			392	153	170
Total both WSAs				1,621	686	578

and hunting, and primitive recreation, such as sightseeing, hiking and photography account for high visitor use in the South Fork WSA, although vehicle-oriented recreation use is about twice that of primitive recreation.

Both vehicle-oriented and primitive recreation in the Sand Hollow WSA is high. Recreation use has increased in both WSAs about 2 to 5 percent each year since 1979. Most vehicle use has been confined to ways and roads in the WSAs; however, some cross country driving (off-road vehicle use) does occur in the southwestern portion of the Sand Hollow WSA and in the Twelvemile Table and Sulphur Butte areas of the South Fork WSA.

Economic Value and Local Income

Resource outputs from these WSAs generating economic activity include grazing, recreation, and oil and gas leases. As of January 1, 1984, there were no geothermal leases on these WSAs.

Economic value and local personal income generated from existing levels of resource outputs are presented for the two areas combined in table 5a and for the individual WSAs in tables 5b and 5c. The terms economic value and local personal income are discussed in the Statewide EIS volume.

Table 5a. Economic Value and Local Personal Income Generated Annually, Existing Program, South Fork (OR-5-33) and Sand Hollow (OR-5-34) WSAs, Combined (1981 price levels)

Resource Output	Unit of Measure	Quantity	Economic Value	Local Personal Income Generated
Grazing	AUM	1,621	$12,223	$28,044
Recreation (incl. hunting)	RVD	Unknown	Unknown	Unknown
Oil & gas leases	Acres	27,482	27,482	8,277
Total			39,705	36,321

Table 5b. Economic Value and Local Personal Income Generated Annually, Existing Program, South Fork WSA (OR-5-33) (1981 price levels)

Resource Output	Unit of Measure	Quantity	Economic Value	Local Personal Income Generated
Grazing	AUM	1,229	$9,267	$21,262
Recreation (incl. hunting)	RVD	Unknown	Unknown	Unknown
Oil & gas leases	Acres	19,391	19,391	5,840
Total			28,658	27,102

Table 5c. Economic Value and Local Personal Income Generated Annually, Existing Program, Sand Hollow WSA (OR-5-34) (1981 price levels)

Resource Output	Unit of Measure	Quantity	Economic Value	Local Personal Income Generated
Grazing	AUM	392	$2,956	$6,782
Recreation (incl. hunting)	RVD	Unknown	Unknown	Unknown
Oil & gas leases	Acres	8,091	8,091	2,437
Total			11,047	9,219

Environmental Consequences

This section discusses the environmental consequences of implementing each of the alternatives. Resources and activities not significantly affected by any of the alternatives are not discussed. General impact conclusions applicable to all WSAs, including impact conclusions based on speculative future developments (developments which are possible, but are not currently proposed), are discussed in the Statewide EIS volume. That volume also discusses certain assumptions that were made for this analysis.

Effects on Wilderness Values

Under the **all wilderness alternative**, all 19,391 acres of the South Fork WSA and all 8,091 acres of the Sand Hollow WSA would be added to the National Wilderness Preservation System (NWPS). The two areas would be managed as separate wilderness areas. Wilderness management would preserve the canyon of the South Fork of the Crooked River, Twelvemile Table, Sulphur Butte, Steens Ridge, and the wilderness values throughout the area, including crucial deer winter range and northern bald eagle habitat.

There are 21 active mining claims located in the northern portion of the South Fork WSA. A moderate amount of mining activity has occurred. The extraction of semiprecious stones, primarily limb casts, has caused some surface disturbance.

No structures or other developments are present. However, the northern portion of the WSA has a high potential for the occurrence of semiprecious stones, and if claimants discovered a valuable mineral deposit before the area was designated wilderness, they would have the right to develop their claims regardless of the effect on wilderness values. Wilderness values in the vicinity of the claims and along access routes to the claims could be adversely affected.

Elimination of vehicle use on 13.4 miles of ways in the WSA would allow revegetation of the ways, thus stabilizing the soil to a limited degree. The area's naturalness and opportunities for solitude and primitive recreation would be enhanced.

Under the **enhanced wilderness alternative**, portions of both WSAs would be combined, and a total of 24,592 acres would be added to the NWPS, assuming the 80-acre private inholding could be acquired. The road separating the South Fork and Sand Hollow study areas and 13.4 miles of ways in the study areas would be closed to vehicle traffic. The absence of vehicles and resulting revegetation of the road and ways would enhance all wilderness values. If the 80-acre inholding located in the South Fork Canyon were acquired, movement through the area for various types of primitive recreation would be enhanced. This would also preclude possible future uses of this land that could be inconsistent with wilderness management.

Within the 2,630 acres of the South Fork WSA recommended nonsuitable, possible surface disturbing activities such as mining, vehicle-oriented recreation use, oil and gas exploration and development, and implementation of livestock and wildlife development projects, including fencing and juniper control, would adversely affect wilderness values. Wilderness values in the 340 acres recommended as nonsuitable in the Sand Hollow WSA could be adversely affected by oil and gas exploration and development and any increase in traffic which might occur on the road along the west boundary of the WSA.

Under the **no wilderness/no action alternative**, naturalness, opportunities for solitude and primitive recreation, and special features would be adversely affected by vehicle-oriented recreation and livestock and wildlife improvement projects. Increased mining and oil and gas development could also occur with adverse impacts on wilderness values. On the other hand, the crucial deer winter range, a special wilderness feature, would be enhanced by proposed rangeland developments which would be allowed under this alternative.

Effects on Energy and Mineral Development

Areas designated wilderness would be withdrawn from mineral exploration and development. Table 6 shows the acres of land that would be withdrawn, including acres that have been classified as having a moderate or high potential for occurrence of certain minerals, and acres of ACMP.

Effects on Vegetation

Areas designated wilderness would not be subject to most surface disturbing activities. Vegetation dependent upon the existing undeveloped environment would thus be maintained.

Under the **all wilderness and enhanced alternatives**, ecological succession would accelerate on about 30 percent of the South Fork WSA if the proposed fence in the Camp Creek Community Allotment is constructed and the grazing system contingent on construction of the fence is then implemented. Construction of the proposed reservoirs would have no significant effect on vegetation beyond the immediate area of the reservoir.

Under the **no wilderness/no action alternative**, 4,950 acres of brush and juniper control in South Fork WSA and 1,040 acres of brush control in the Sand Hollow WSA would temporarily reduce vegetation diversity by reducing juniper, brush and forb cover and increasing grasses.

Effects on Wildlife

Wildlife habitat would be preserved in areas designated wilderness.

Under the **all and enhanced wilderness alternatives**, proposed wildlife habitat improvement projects, including boulder placement in streams, nest structures, two guzzlers and streambank riprap in the South Fork WSA and a guzzler in the Sand Hollow WSA might or might not be allowed, depending on a site-specific assessment of whether they would conform with Wilderness Management Policy. Prescribed burning on 2,520 acres in the South Fork WSA would not be allowed under these alternatives. The opportunity to increase habitat diversity would be foregone.

Under the **no wilderness/no action alternative**, all

Table 6. Effects of Alternatives on Energy and Mineral Resource Development, South Fork (OR-5-33) and Sand Hollow (OR-5-34) WSAs

	Acres Withdrawn					
	All Wilderness		Enhanced Wilderness	Partial		No Wilderness/No Action
Acres Withdrawn	So. Fork	Sand Hollow	(both WSAs combined)	So.Fork	Sand Hollow	(both WSAs)
Total acres	19,391	8,091	24,512[1]	16,761	7,751	0
Oil and gas rated high	19,391	8,091	24,512	16,761	7,751	0
Semiprecious stones rated high	1,800	0	0	0	0	0
Bentonite and zeolites rated high	0	540	0	0	0	0
Area of Critical Mineral Potential	19,391	8,091	24,512	16,761	7,751	0

[1] Development also precluded on an additional 80 acres if private land is acquired as proposed under this alternative.

planned wildlife improvement projects would be allowed. Boulder placement in the lower reaches of the South Fork of the Crooked River would increase fish population by 30 percent. Nest structures would improve nesting availability by up to 200 percent for waterfowl along the South Fork. Past grazing use has reduced streamside plant cover necessary for nest success.

Streambank riprap using overlapping juniper trees would provide stabilization of approximately 15 percent of the stream channel which is presently eroding, reducing bank erosion and stream channel sedimentation and thereby increasing fish populations and aquatic insects.

Prescribed burning would increase habitat diversity by providing different ecological stages of understory vegetation. Spring and summer forage for mule deer would increase 500 percent. Burning would also benefit winter browse plants. There would be a 10 percent decrease in habitat for tree-oriented wildlife species but an overall increase in wildlife dependent on shrub and grass.

Effects on Livestock Grazing

The **all wilderness alternative** would have no impact on short-term forage allocation. However, opportunities to increase livestock forage production by 91 AUMs in the South Fork WSA and 55 AUMs in the Sand Hollow WSA would be foregone, since proposed sagebrush burning and juniper control would not be allowed. These vegetative manipulation projects have a benefit/cost ratio less than 1:1.

Fence construction proposed in Camp Creek Community Allotment in the South Fork WSA would permit implementation of a proposed grazing system. This development might or might not be allowed, depending on a site-specific assessment of whether it would conform with Wilderness Management Policy. If not allowed, an opportunity to increase forage by 226 AUMs would be foregone. Another 216 AUMs, which are possible through improved management not dependent on developments and an additional 408 AUMs of unallocated forage, might also be foregone depending on whether or not the increase conforms with Wilderness Management Policy. A total of 941 AUMs may be foregone if AUM increases were not allowed or forage not allocated under this alternative. The fence project has a benefit/cost ratio greater than 1:1.

Similarly, in the Sand Hollow WSA, two reservoirs with a potential increase of 98 AUMs and allocation of an additional 170 AUMs of currently available but unallocated forage are proposed. If these improvements and allocations are not implemented, the potential increase of 268 AUMs would be foregone. The reservoirs have a cost/benefit ratio of less than 1:1.

Total increases potentially foregone under the all wilderness alternative could be as much as 941 AUMs in South Fork WSA, and as much as 323 in Sand Hollow WSA.

Closure of ways under the all wilderness alternative would not have a significant impact on livestock management in either the South Fork or Sand Hollow WSAs.

The **enhanced wilderness alternative** would have similar effects as the all wilderness alternative, except that closure of interior dead-end roads and the road between the WSAs would further limit vehicle access for livestock management and maintenance of improvements. In addition, an increase of 49 AUMs through brush control and 66 AUMs from approved management in the South Fork WSA would be realized since these areas are in the nonsuitable area. Total AUMs potentially foregone under the enhanced wilderness alternative could be as much as 826 AUMs in the South Fork WSA, and 323 AUMs in the Sand Hollow WSA.

There would be no impact on livestock management in the WSAs under the **no wilderness/no action alternative**. All proposed range improvements could be constructed and available AUMs allocated, resulting in an increase of 941 AUMs in the South Fork WSA and 323 AUMs in the Sand Hollow WSA. All roads and ways would remain open.

Effects on Recreation Use

Vehicle-oriented recreation use under the all wilderness alternative would decrease moderately in the South Fork WSA and substantially in the Sand Hollow WSA from closure of ways, thereby enhancing opportunities for primitive recreation. Vehicle travel would be allowed to continue on the interior roads and the road separating the two WSAs.

Closure of ways would adversely affect rockhounds and hunters who utilize vehicles to gain access to their diggings and hunting areas within the WSAs. Vehicle-oriented recreation use probably would be displaced into nearby areas. Recreation use not dependent on vehicles (hiking, sightseeing, photography, etc.) would be expected to increase slightly. There would be a moderate net decrease in overall recreation use in both WSAs.

Under the **enhanced wilderness alternative**, outstanding opportunities for primitive recreation would be enhanced by elimination of motorized vehicles from all roads within and between the portions of the WSAs recommended suitable. Other impacts would be similar to those of the all wilderness alternative, except that road closures would further restrict hunting access. Further decreases in vehicle-oriented recreation use would be offset by increases in primitive recreation. A small net decrease in overall recreation use would occur in both WSAs.

Under the **no wilderness/no action alternative**, recreation use is expected to continue to increase slightly, as it has in recent years. Vehicle-oriented recreation uses, livestock and wildlife developments would reduce opportunities for primitive recreation. There would be no significant impact to overall recreation use under this alternative.

Effects on Economic Value and Local Income

The economic effects of the alternatives are presented in tables 7a-c and 8a-c. Tables 7a-c show the effects on economic value and tables 8a-c, the effects on local personal income. It is not known if the expected grazing increases or structural developments such as reservoirs, fences, catchments, goose nests, stream structures and riprap proposed for these areas would be allowed under wilderness designation. It is known that the vegetative manipulation projects would not be allowed. A juniper control project in the nonsuitable portion of the South Fork WSA might be implemented under the enhanced wilderness alternative.

The columns for the wilderness alternatives show the effects as a range of values dependent on whether these projects were allowed.

Currently, there is little dependence on vehicles for livestock management in these two WSAs. Wilderness designation would restrict such vehicle use unless there were no practical alternative. The maximum impact from road closures would be an increase in cost of about $225 per year in the South Fork WSA and $68 per year in the Sand Hollow WSA, or a total of $293, under the enhanced wilderness alternative. Under the all wilderness alternative, increased operator costs due to road closures would amount to $137 and $13 per year for the two WSAs.

Table 7a. Effects of Alternatives on Annual Economic Value, South Fork (OR-5-33) and Sand Hollow (OR-5-34) WSAs, Combined (1981 price levels)

Item	Unit of Measure	All Wilderness	Enhanced Wilderness	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS				
Grazing:				
Adjustments [1]	AUM	0 to +578	0 to +578	+578
Management [2]	AUM	0 to +216	+66 to +216	+216
Investment [3]	AUM	0 to +324	+49 to +373	+470
Big game hunting [4]	RVD	0 to +13	0 to +13	+13
Upland game hunting[4]	RVD	0 to +13	0 to +13	+13
Waterfowl hunting [4]	RVD	0 to +322	0 to +322	+322
Nongame wildlife [4]	RVD	0 to +15	0 to +15	+15
Reduced erosion [4]	$	0 to +1,250	0 to +1,250	+1,250
Resident fish reprod. [4]	$	0 to +4,500	0 to +4,500	+4,500
Oil & gas leases	Acres	-27,482	-24,512	0
VALUE OF PROPOSED INVESTMENTS [5]				
Grazing	$	0 to +2,077	+271 to +2,419	+3,015
Big game hunting	$	0 to +276	0 to +276	+276
Upland game hunting	$	0 to +360	0 to +360	+360
Waterfowl hunting	$	0 to +8,394	0 to +8,394	+8,394
Nongame wildlife	$	0 to +543	0 to +543	+543
Reduced erosion	$	0 to +1,157	0 to +1,157	+1,157
Resident fish reprod.	$	0 to +4,164	0 to +4,164	+4,164
Total [6]	$	0 to +16,971	+271 to +17,313	+17,909
Investments [7]	$	0 to -5,081	-967 to -6,072	-7,163
Net economic value	$	0 to +11,890	-696 to +11,241	+10,746
VALUE OF OTHER EXPECTED CHANGES IN OUTPUTS				
Grazing:				
Adjustments	$	0 to +4,358	0 to +4,358	+4,358
Management	$	0 to +1,629	+498 to +1,629	+1,629
Oil and gas leases	$	-27,482	-24,512	0
Reduced access [8]	$	-150	-293	0
Total	$	-27,632 to -21,645	-24,307 to -18,818	+5,987
VALUE OF TOTAL EXPECTED CHANGES IN OUTPUTS				
All categories	$	-27,632 to -9,755	-25,003 to -7,577	+16,733

[1] Adjustments to use currently available but unallocated livestock forage.

[2] Expected future increases due to improved management that is not dependent on investments.

[3] Expected future increases due to range improvement investments.

[4] Expected future increases due to proposed structural wildlife projects.

[5] Vegetative manipulation projects involving up to $101,133 total expenditures, and structural projects involving up to $169,729. Amounts shown in the table represent combined results of both types of projects, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

[6] Detail may not sum to "Total" due to rounding.

[7] Average annual cost of investment expenditures amortized at 7.875% over 50-year period.

[8] Additional cost (shown as negative value) due to restriction of vehicular access for livestock operator.

Table 7b. Effects of Alternatives on Annual Economic Value, South Fork WSA (OR-5-33) (1981 price levels)

Item	Unit of Measure	All Wilderness	Enhanced Wilderness	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS				
Grazing:				
Adjustments [1]	AUM	0 to +408	0 to +408	+408
Management [2]	AUM	0 to +216	+66 to +216	+216
Investment [3]	AUM	0 to +226	+49 to +275	+317
Big game hunting [4]	RVD	0 to +9	0 to +9	+9
Upland game hunting [4]	RVD	0 to +9	0 to +9	+9
Waterfowl hunting [4]	RVD	0 to +322	0 to+322	+322
Nongame wildlife [4]	RVD	0 to +10	0 to +10	+10
Reduced erosion [4]	$	0 to +1,250	0 to +1,250	+1,250
Resident fish reprod. [4]	$	0 to +4,500	0 to +4,500	+4,500
Oil & gas leases	Acres	-19,391	-16,761	0
VALUE OF PROPOSED INVESTMENTS [5]				
Grazing	$	0 to +1,393	+271 to +1,735	+2,028
Big game hunting	$	0 to +184	0 to +184	+184
Upland game hunting	$	0 to +240	0 to +240	+240
Waterfowl hunting	$	0 to +8,394	0 to +8,394	+8,394
Nongame wildlife	$	0 to +362	0 to +362	+362
Reduced erosion	$	0 to +1,157	0 to +1,157	+1,157
Resident fish reprod.	$	0 to +4,164	0 to +4,164	+4,164
Total [6]	$	0 to +15,894	+271 to +16,236	+16,529
Investments [7]	$	0 to -3,760	-967 to -4,751	-5,408
Net economic value	$	0 to +12,134	-696 to +11,485	+11,121
VALUE OF OTHER EXPECTED CHANGES IN OUTPUTS				
Grazing:				
Adjustments	$	0 to +3,076	0 to +3,076	+3,076
Management	$	0 to +1,629	+498 to +1,629	+1,629
Oil and gas leases	$	-19,391	-16,761	0
Reduced access [8]	$	-137	-225	0
Total	$	-19,528 to -14,823	-16,488 to -12,281	+4,705
VALUE OF TOTAL EXPECTED CHANGES IN OUTPUTS				
All categories	$	-19,528 to -2,689	-17,184 to -796	+15,826

[1] Adjustments to use currently available but unallocated livestock forage.

[2] Expected future increases due to improved management that is not dependent on investments.

[3] Expected future increases due to range improvement investments.

[4] Expected future increases due to proposed structural wildlife projects.

[5] Vegetative manipulation projects involving up to $87,440 total expenditures, and structural projects involving up to $119,366. Amounts shown in the table represent combined results of both types of projects, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

[6] Detail may not sum to "Total" due to rounding.

[7] Average annual cost of investment expenditures amortized at 7.875% 50-year period.

[8] Additional cost (shown as negative value) due to restriction of vehicular access for livestock operator.

Table 7c. Effects of Alternatives on Annual Economic Value, Sand Hollow WSA (OR-5-34) (1981 price levels)

Item	Unit of Measure	All Wilderness	Enhanced Wilderness	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS				
Grazing:				
Adjustments [1]	AUM	0 to $170	0 to $170	$170
Investment [2]	AUM	0 to $98	0 to $98	$153
Big game hunting [3]	RVD	0 to $4	0 to $4	$4
Upland game hunting [3]	RVD	0 to $4	0 to $4	$4
Nongame wildlife [3]	RVD	0 to $5	0 to $5	$5
Oil & gas leases	Acres	-8,091	-7,751	0
VALUE OF PROPOSED INVESTMENTS [4]				
Grazing	$	0 to $684	0 to $684	$987
Big game hunting	$	0 to $92	0 to $92	$92
Upland game hunting	$	0 to $120	0 to $120	$120
Nongame wildlife	$	0 to $181	0 to $181	$181
Total [5]	$	0 to $1,077	0 to $1,077	$1,380
Investments[6]	$	0 to -1,321	0 to -1,321	-1,755
Net economic value[7]	$	-244 to 0	-244 to 0	-375
VALUE OF OTHER EXPECTED CHANGES IN OUTPUTS				
Grazing:				
Adjustments	$	0 to $1,282	0 to $1,282	$1,282
Oil and gas leases	$	-8,091	-7,751	0
Reduced access [8]	$	-13	-68	0
Total	$	-8,104 to -6,822	-7,819 to -6,537	$1,282
VALUE OF TOTAL EXPECTED CHANGES IN OUTPUTS				
All categories	$	-8,348 to -6,822	-8,063 to -6,537	$907

[1] Adjustments to use currently available but unallocated livestock forage.

[2] Expected future increases due to range improvement investments.

[3] Expected future increases due to proposed structural wildlife projects.

[4] Vegetative manipulation projects involving up to $13,693 total expenditures, and structural projects involving up to $50,363. Amounts shown in the table represent combined results of both types of projects, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

[5] Detail may not sum to "Total" due to rounding.

[6] Average annual cost of investment expenditures amortized at 7.875% over 50-year period.

[7] For alternatives reflecting a range of negative net values (i.e., investment costs exceeding benefits), the figures are reversed to show the larger negative value as the lower end of the range (e.g., -20 to 0) so that the summation of effects for all categories in each column will show the full range of potential effects.

[8] Additional cost (shown as negative value) due to restriction of vehicular access for livestock operator.

Table 8a. Effects of Alternatives on Local Personal Income, South Fork (OR-5-33) and Sand Hollow (OR-5-34) WSAs, Combined (1981 price levels)

Item	Unit of Measure	All Wilderness	Enhanced Wilderness	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS				
Grazing:				
Adjustments [1]	AUM	0 to $578	0 to $578	$578
Management [2]	AUM	0 to $216	$66 to $216	$216
Investment [3]	AUM	0 to $324	$49 to $373	$470
Big game hunting [4]	RVD	0 to $13	0 to $13	$13
Upland game hunting[4]	RVD	0 to $13	0 to $13	$13
Waterfowl hunting [4]	RVD	0 to $322	0 to $322	$322
Nongame wildlife [4]	RVD	0 to $15	0 to $15	$15
Reduced erosion [4]	$	0 to $1,250	0 to $1,250	$1,250
Resident fish reprod.[4]	$	0 to $4,500	0 to $4,500	$4,500
Oil & gas leases	Acres	-27,482	-24,512	0
INCOME FROM PROPOSED INVESTMENTS[5]				
Grazing	$	0 to $5,605	$848 to $6,453	$8,131
Big game hunting	$	0 to $141	0 to $141	$141
Upland game hunting	$	0 to $268	0 to $268	$268
Waterfowl hunting	$	0 to $4,672	0 to $4,672	$4,672
Nongame wildlife	$	Unknown	Unknown	Unknown
Reduced erosion	$	Unknown	Unknown	Unknown
Resident fish reprod.	$	Unknown	Unknown	Unknown
Construction activity [6]	$	0 to $7,592	$1,403 to $8,995	$12,542
Total [7]	$	0 to $10,686	$848 to $11,534	$13,212
INCOME FROM OTHER EXPECTED OUTPUT CHANGES				
Grazing:				
Adjustments	$	0 to $9,999	0 to $9,999	$9,999
Management	$	0 to $3,737	$1,142 to $3,737	$3,737
Oil and gas leases	$	-8,277	-7,282	0
Total [7]	$	-8,277 to $5,459	-6,140 to $6,454	$13,736
VALUE OF TOTAL EXPECTED CHANGES IN OUTPUTS				
All categories [7]	$	-8,277 to $16,145	-5,292 to $17,988	$26,948

[1] Adjustments to use currently available but unallocated livestock forage.

[2] Expected future increases due to improved management that is not dependent on investments.

[3] Expected future increases due to range improvement investments.

[4] Expected future increases due to proposed structural wildlife projects.

[5] Vegetative manipulation projects involving up to $101,133 total expenditures, and structural projects involving up to $169,729. Amounts shown in the table represent combined results of both types of projects, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

[6] Local personal income generated annually during assumed 5-year construction period. This amount cannot be added to the income resulting from grazing and hunting activity because it is not sustained over the analysis period.

[7] Detail may not sum to "Total" due to rounding. Total omits income from construction which is limited to 5-year period. See footnote 6.

Table 8b. Effects of Alternatives on Local Personal Income, South Fork WSA (OR-5-33) (1981 price levels)

Item	Unit of Measure	All Wilderness	Enhanced Wilderness	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS				
Grazing:				
Adjustments [1]	AUM	0 to +408		
Management [2]	AUM	0 to +216	+66 to +216	+216
Investment [3]	AUM	0 to +226	+49 to +275	+317
Big game hunting [4]	RVD	0 to +9	0 to +9	+9
Upland game hunting [4]	RVD	0 to +9	0 to +9	+9
Waterfowl hunting [4]	RVD	0 to +322	0 to +322	+322
Nongame wildlife [4]	RVD	0 to +10	0 to +10	+10
Reduced erosion [4]	$	0 to +1,250	0 to +1,250	+1,250
Resident fish reprod. [4]	$	0 to +4,500	0 to +4,500	+4,500
Oil & gas leases	Acres	-19,391	-16,761	0
INCOME FROM PROPOSED INVESTMENTS [5]				
Grazing	$	0 to +3,910	+848 to +4,758	+5,484
Big game hunting	$	0 to +98	0 to +98	+98
Upland game hunting	$	0 to +151	0 to +151	+151
Waterfowl hunting	$	0 to +4,672	0 to +4,672	+4,672
Nongame wildlife	$	Unknown	Unknown	Unknown
Reduced erosion	$	Unknown	Unknown	Unknown
Anad. fish reprod.	$	Unknown	Unknown	Unknown
Construction activity [6]	$	0 to +5,776	+1,403 to +7,179	+9,976
Total [7]	$	0 to +8,831	+848 to +9,679	+10,405
INCOME FROM OTHER EXPECTED OUTPUT CHANGES				
Grazing:				
Adjustments	$	0 to +7,058	0 to +7,058	+7,058
Management	$	0 to +3,737	+1,142 to +3,737	+3.737
Oil and gas leases	$	-5,840	-5,048	0
Total[7]	$	-5,840 to +4,955	-3,906 to +5,747	+10,795
INCOME FROM ALL OUTPUT CHANGES				
All categories [7]	$	-5,840 to +13,786	-3,058 to +15,426	+21,200

[1] Adjustments to use currently available but unallocated livestock forage.

[2] Expected future increases due to improved management that is not dependent on investments.

[3] Expected future increases due to range improvement investments.

[4] Expected future increases due to proposed structural wildlife projects.

[5] Vegetative manipulation projects involving up to $87,440 total expenditures, and structural projects involving up to $119,366. Amounts shown in the table represent combined results of both types of projects, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

[6] Local personal income generated annually during assumed 5-year construction period. This amount cannot be added to the income resulting from grazing and hunting activity because it is not sustained over the analysis period.

[7] Detail may not sum to "Total" due to rounding. Total omits income from construction which is limited to 5-year period. See footnote 6.

Table 8c. Effects of Alternatives on Local Personal Income, Sand Hollow WSA (OR-5-34) (1981 price levels)

Item	Unit of Measure	All Wilderness	Enhanced Wilderness	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS				
Grazing:				
Adjustments [1]	AUM	0 to +170	0 to +170	+170
Investment[2]	AUM	0 to +98	0 to +98	+153
Big game hunting[3]	RVD	0 to +4	0 to +4	+4
Upland game hunting[3]	RVD	0 to +4	0 to +4	+4
Nongame wildlife[3]	RVD	0 to +5	0 to +5	+5
Oil & gas leases	Acres	-8,091	-7,751	0
INCOME FROM PROPOSED INVESTMENTS[4]				
Grazing	$	0 to +1,695	0 to +1,695	+2,647
Big game hunting	$	0 to +43	0 to +43	+43
Upland game hunting	$	0 to +117	0 to +117	+117
Nongame wildlife	$	Unknown	Unknown	Unknown
Construction activity[5]	$	0 to +1,816	0 to +1,816	+2,566
Total[6]	$	0 to +1,855	0 to +1,855	+2,807
INCOME FROM OTHER EXPECTED OUTPUT CHANGES				
Grazing:				
Adjustments	$	0 to +2,941	0 to +2,941	+2,941
Oil and gas leases	$	-2,437	-2,234	0
Total[6]	$	-2,437 to +504	-2,234 to +707	+2,941
INCOME FROM ALL OUTPUT CHANGES				
All categories[6]	$	-2,437 to +2,359	-2,234 to +2,562	+5,748

[1] Adjustments to use currently available but unallocated livestock forage.

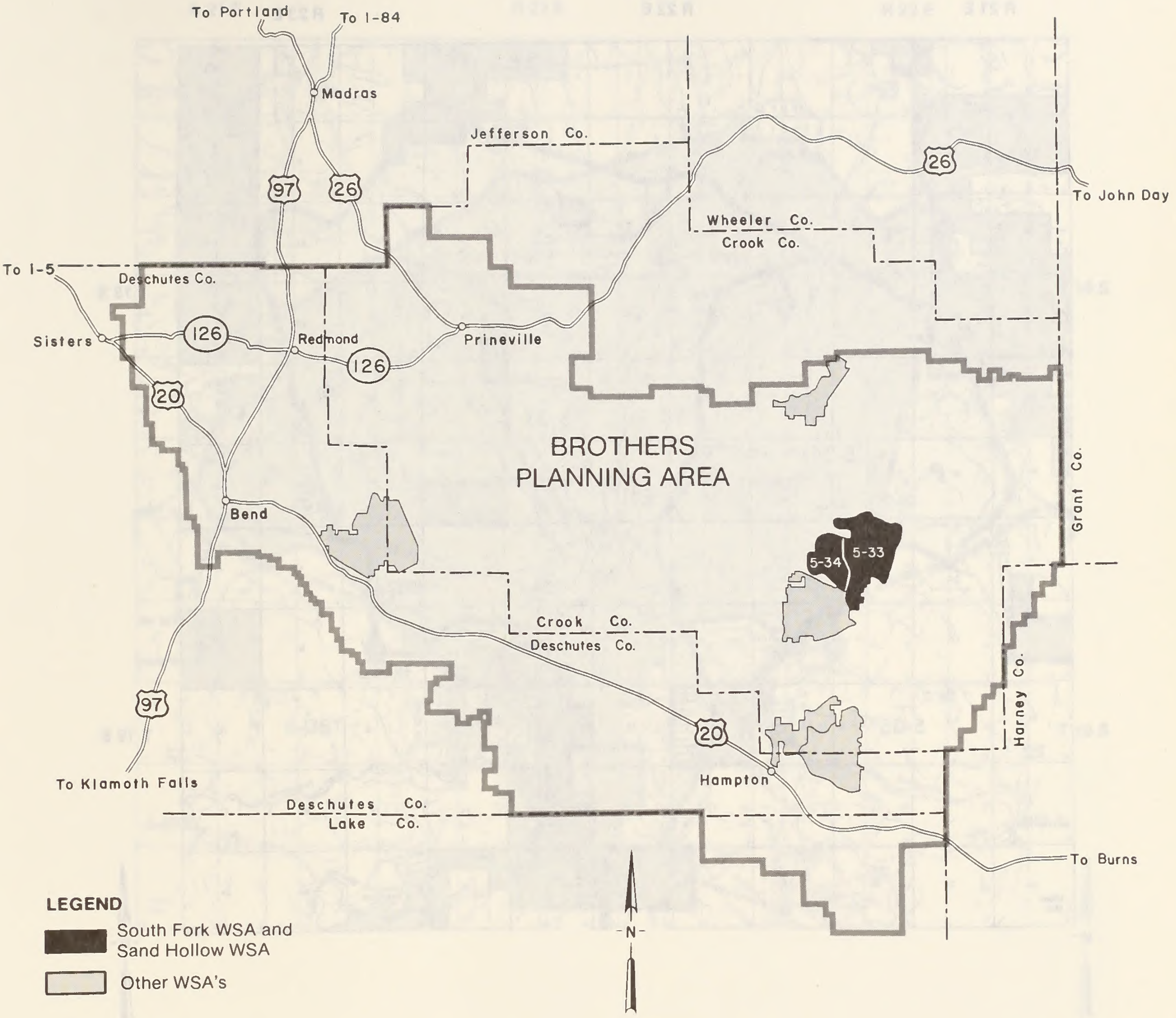
[2] Expected future increases due to range improvement investments.

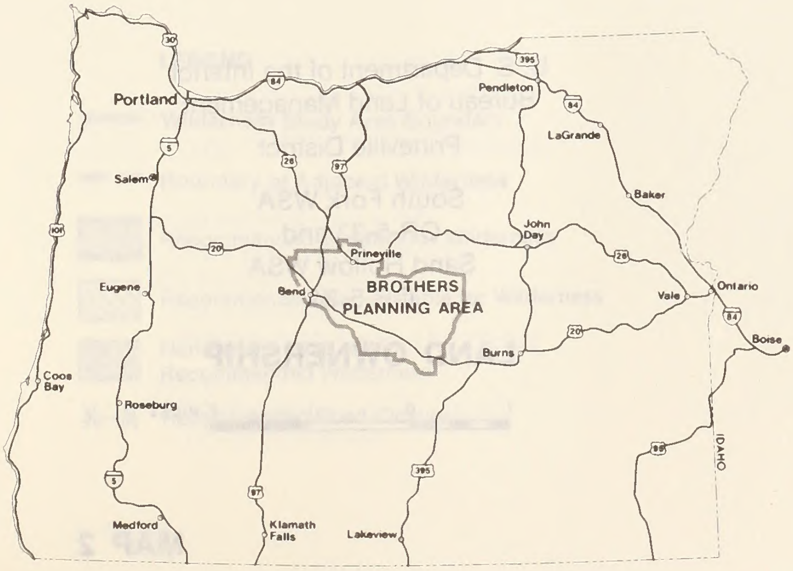
[3] Expected future increases due to proposed structural wildlife projects.

[4] Vegetative manipulation projects involving up to $13,693 total expenditures, and structural projects involving up to $50,363. Amounts shown in the table represent combined results of both types of projects, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

[5] Local personal income generated annually during assumed 5-year construction period. This amount cannot be added to the income resulting from grazing and hunting activity because it is not sustained over the analysis period.

[6] Detail may not sum to "Total" due to rounding. Total omits income from construction which is limited to 5-year period. See footnote 5.





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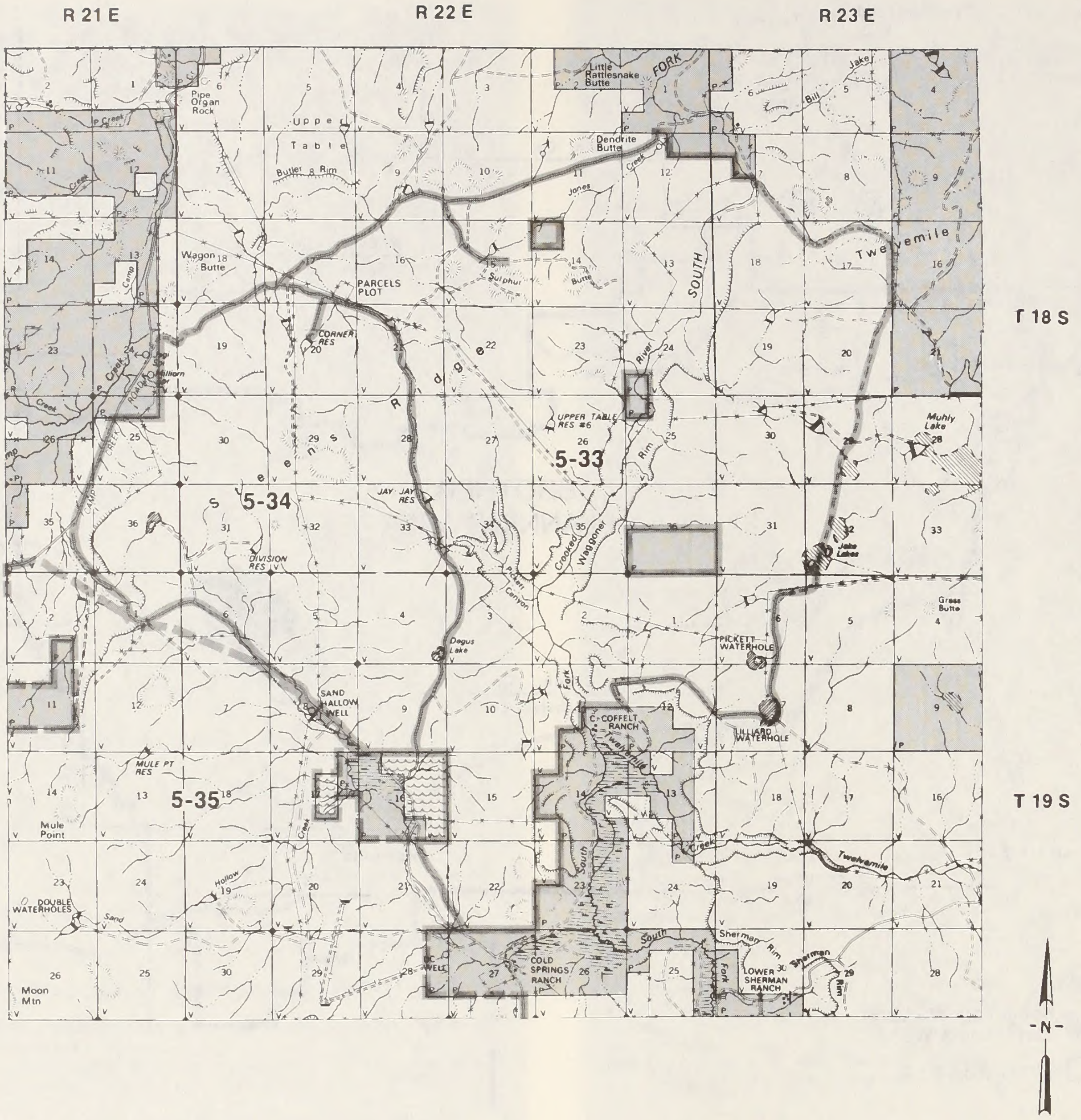
South Fork WSA
OR-5-33 and
Sand Hollow WSA
OR-5-34

LOCATION MAP

10 0 10 MILES

MAP 1



LEGEND

- Wilderness Study Area Boundary
- Boundary of Adjacent Wilderness
- ☐ Bureau of Land Management
- ■ Private
- ▨ BLM Surface-State or Private Subsurface (Split Estate)

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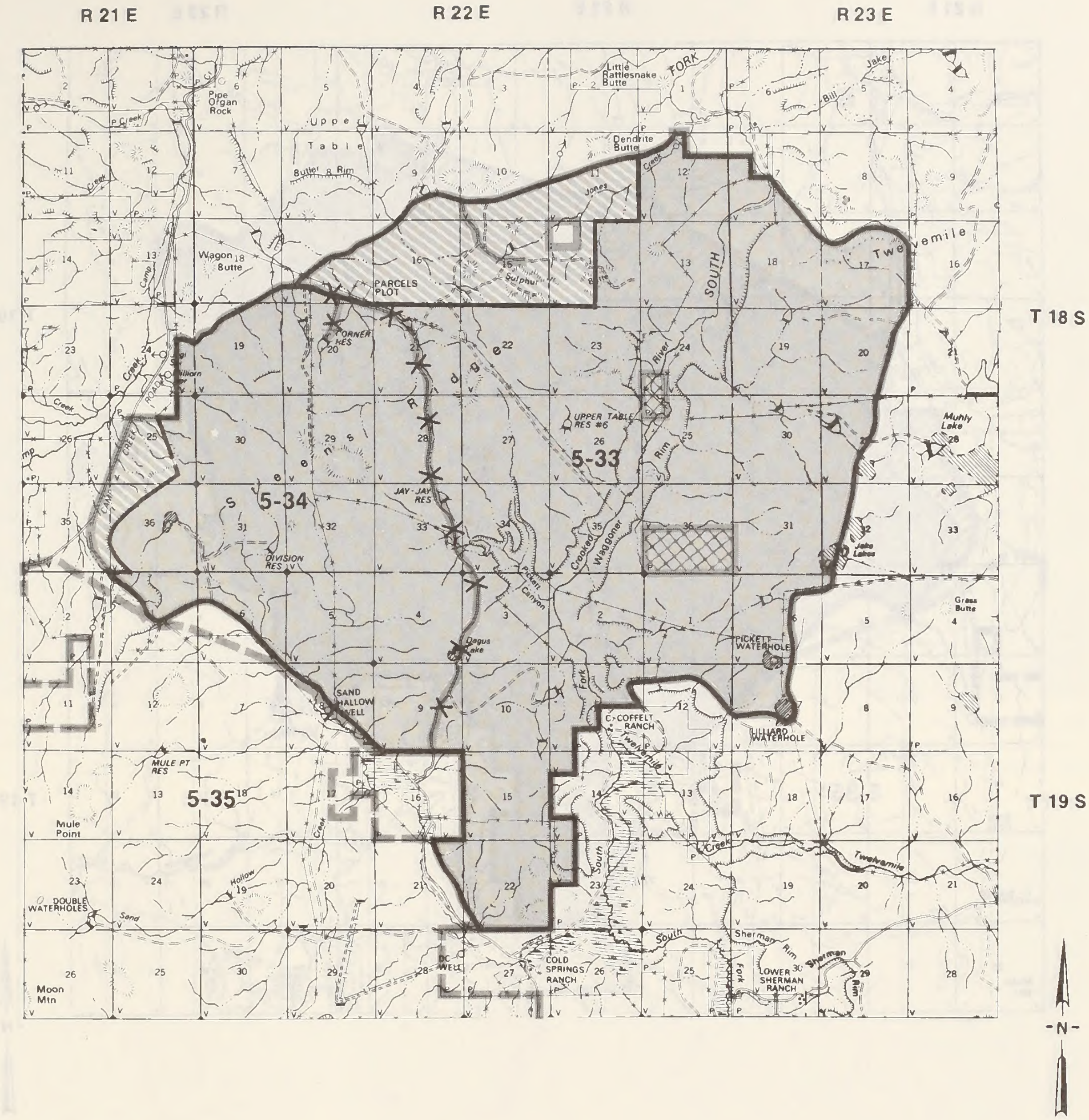
Prineville District

South Fork WSA
OR-5-33 and
Sand Hollow WSA
OR-5-34

LAND OWNERSHIP

1 0 1 2 MILES

MAP 2



LEGEND

▬ Wilderness Study Area Boundary

╍ Boundary of Adjacent Wilderness

▩ Recommended Suitable for Wilderness

▨ Recommended Non-suitable for Wilderness

▦ Non-Federal Land within Recommended Wilderness

✕ ✕ Recommended Road Closure

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South Fork WSA
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Sand Hollow WSA
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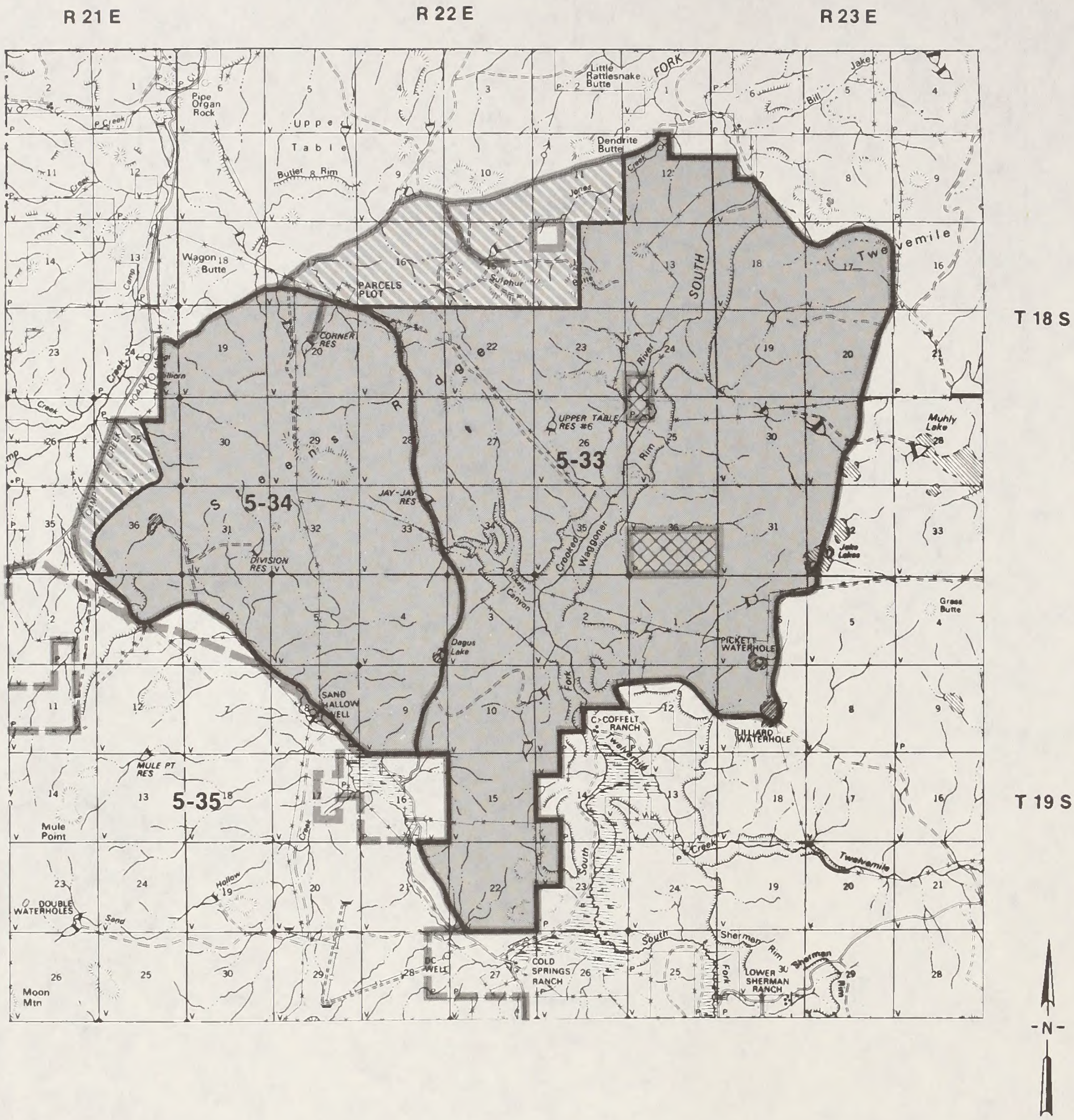
ENHANCED ALTERNATIVE

1 0 1 2 MILES

MAP 3



LEGEND

- — Wilderness Study Area Boundary
- - - Boundary of Adjacent Wilderness
- ▩ Recommended Suitable for Wilderness
- ▨ Recommended Non-suitable for Wilderness
- ▦ Non-Federal Land within Recommended Wilderness

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South Fork WSA
OR-5-33 and
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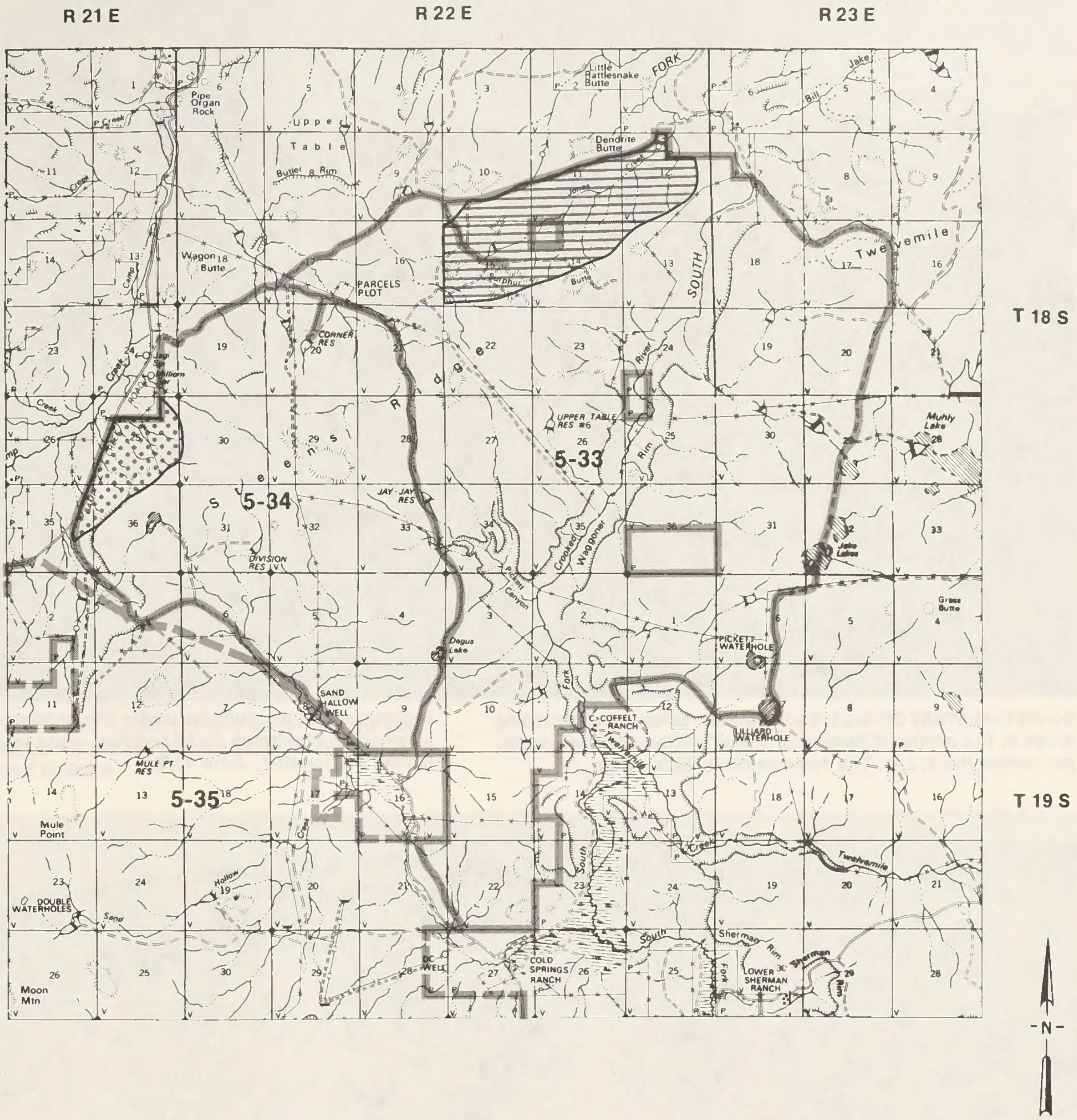
PARTIAL ALTERNATIVE

1 0 1 2 MILES

MAP 4



▤ **High Potential**
(4D) for Semiprecious Stones

░ **High Potential**
(4D) for Bentonite
Medium Potential
(3C) for Zeolites

Entire WSA:
High Potential
(4C) for Oil and Gas

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South Fork WSA
OR-5-33 and
Sand Hollow WSA
OR-5-34

MEDIUM OR HIGH POTENTIAL MINERAL OR ENERGY RESOURCES

1 0 1 2 MILES

MAP 5

South Fork WSA, OR-5-33. Looking east toward rockhounding areas in the northern portion of the WSA (the background is not within the WSA). The foreground is within area recommended nonsuitable under the enhanced (preferred) alternative. Illustrates rockhounding areas where mining claims are located. June 1979.

South Fork WSA, OR-5-33. Looking northwest across the northern portion of the South Fork of the Crooked River Canyon. Within the area recommended suitable under the enhanced (preferred) alternative. Illustrates typical canyon scenery. June 1979.

South Fork WSA, OR-5-33. Looking north in the mid-portion of the South Fork of the Crooked River Canyon. Within the area recommended suitable under the enhanced (preferred) alternative. Illustrates the scenic qualities of the canyon. June 1979.

Sand Hollow WSA, OR-5-34. Looking north into the central portion of the WSA. Within area recommended suitable under the enhanced (preferred) alternative. Illustrates the size of the Steens Ridge. September 1979.

Sand Hollow WSA, OR-5-34. Looking west toward the northern portion of the WSA. Within the area recommended suitable under the enhanced (preferred) alternative. Typical example of basalt rim and dense juniper tree clusters within the WSA. September 1979.

Gerry Mountain Wilderness Study Area (OR-5-35)

General Description of Study Area

The Gerry Mountain wilderness study area (WSA) is located in Crook County, approximately 70 miles southeast of Bend and 12 miles north of Hampton, Oregon, and U.S. Highway 20. It is about 200 miles southeast of Portland, Oregon (see map 1).

Gerry Mountain WSA is relatively solid in shape, containing Gerry and Moon Mountains and Mule Point (see map 2). There are 19,980 acres of public land within the WSA. In addition, there is one 640-acre parcel of split estate (federally managed surface, private or state owned subsurface mineral rights) in the east-central part of the WSA. Rights to coal, oil and gas on this parcel are not owned by the federal government. Private and public lands surround the WSA.

The main feature of the WSA is Gerry Mountain which rises 1,100 feet above the surrounding countryside. Low rolling hills and small, enclosed basins surround Gerry Mountain, Moon Mountain and Mule Point.

Much of the WSA is covered with juniper. Big sagebrush, rabbitbrush, and bunchgrass form the understory. There are no naturally occurring perennial water sources within the WSA, although there are 12 reservoirs.

The southern and eastern boundaries are a combination of private property and county-maintained roads. The northern boundary is a combination of rimrock and private property. The western boundary is a combination of privately maintained road and private property.

Interrelationships

Another WSA, Sand Hollow (OR-5-35), is adjacent to Gerry Mountain WSA on the northeast. The two study areas are separated by a county road.

Issues

Issues relating to each WSA were raised by BLM and the public during the wilderness inventory and EIS planning and scoping process. These issues concern both the effects of wilderness designation on existing and potential land uses or resources in the WSA, as well as the effects of existing and potential land uses or resources on wilderness values. Land uses or resources raised as issues specifically for this WSA include:

- proposed livestock developments in the WSA and the use of vehicles for livestock management, and

- potential oil and gas exploration and development.

Description of the Alternatives

The following alternatives are analyzed:

- all wilderness
- partial
- no wilderness/no action (preferred alternative)

An enhanced wilderness alternative is not analyzed because there is no feasible opportunity to significantly enhance wilderness values by acquiring private inholdings, closing interior roads or acquiring adjacent private land. An alternative which would combine Gerry Mountain WSA with the adjacent Sand Hollow WSA (OR-5-34) is not analyzed because closing the road separating the two WSAs is not feasible; the road is maintained by the county and provides essential access for local traffic.

All Wilderness

Under the all wilderness alternative, all 19,980 acres of public land in Gerry Mountain WSA would be recommended suitable as wilderness (see map 2). For purposes of analysis, it is assumed the 640-acre parcel of split estate would not be acquired.

Partial

Under the partial alternative, 15,830 acres of public land in Gerry Mountain WSA would be recommended suitable as wilderness (see map 3). A 1,490-acre area on the north edge of the WSA would be recommended nonsuitable. This area is somewhat isolated from the main body of the WSA by a 'finger' of private land and rimrock. A powerline, a constructed fire line, mining claims, an adjacent ranch headquarters and bentonite plant are located just outside the WSA and can be seen from the portion recommended as nonsuitable. This reduces the apparent naturalness of that area.

Another area on the eastern boundary of the WSA, totaling 2,660 acres, is also recommended as nonsuitable under this alternative due to livestock development which are evident and detract from the natural character of the area.

The boundary between the portions recommended suitable for wilderness and the portions recommended nonsuitable would be a fence and access way on the east and a rimrock cliff on the north. For purposes of analysis, it is assumed the 640-acre parcel of split-estate would not be acquired.

No Wilderness/No Action (Preferred Alternative)

The no wilderness/no action alternative would recommend the entire WSA nonsuitable as wilderness. It represents the situation most likely to occur without wilderness designation. The area would be managed according to the current land use plan, which includes the following features relevant to this analysis:

- construction of proposed livestock and wildlife improvement projects (water developments),
- continued use of motor vehicles, and
- continued availability for mineral exploration and development.

Table 1 summarizes the proposed management of the WSA under each alternative.

Table 2 summarizes the environmental consequences of each alternative.

Manageability of the Area as Wilderness

The Gerry Mountain WSA would be manageable as

Table 1. Summary of Proposed Management Under Each Alternative, Gerry Mountain WSA (OR-5-35)

Proposed Management	All Wilderness	Partial	No Action No Wilderness/
Acres Designated as Wilderness	19,980	15,830	0
Acres Closed to ORVs by Wilderness Designation	19,980	15,830	0
Miles of Ways Closed	14.2	6.2	0
Acres Withdrawn from Mineral Location and Leasing by Wilderness Designation	19,980	15,830	0
Structural Wildlife Projects Developed: Catchments & Guzzlers (number)	0-2	0-2	2
Structural Livestock Projects Developed: Reservoirs & Waterholes (number)	0-2	0-2	2
Unallocated Existing Forage Allocated (AUMs)	0-255	80-255	255

Table 2. Summary of Environmental Consequences of Alternatives, Gerry Mountain WSA (OR-5-35)

Resource or Activity	All Wilderness	Partial	No Wilderness/No Action (Preferred Alternative)
Wilderness Values	Would add 19,980 acres to the NWPS and assure preservation of naturalness and opportunities for solitude on juniper- and sagebrush-covered slopes of Gerry Mountain, Mule Mountain, Mule Point, and surrounding hills. Closure of 14.2 miles of ways would enhance naturalness and opportunities for solitude and primitive recreation. Mineral development on split-estate inholding could adversely affect wilderness values. The area would be manageable as wilderness.	Would add 15,830 acres to the NWPS. Assure preservation of naturalness and solitude in the portion recommended suitable. Adverse effects of mineral development and livestock management activities would not be significant on the 4,150 acres recommended nonsuitable because of limited number of wilderness values in these areas. Closure of 6.2 miles of ways would enhance naturalness and opportunities for solitude and primitive recreation. Mineral development on split-estate inholding could adversely affect wilderness values. The area would be manageable as wilderness.	Wilderness characteristics would be adversely affected by vehicle-oriented recreation, as ways would remain open to vehicle travel. Mining and oil and gas development could occur which would have a substantial adverse effect on naturalness and solitude.
Energy and Mineral Development	Development precluded on 19,980 acres, including 19,980 acres with high potential for oil and gas, and 1,460 acres with high potential for bentonite and moderate potential for zeolites. Includes 19,980 acres of nominated ACMP.	Development precluded on 15,830 acres, including 15,830 acres with high potential for oil and gas, and 760 acres with high potential for bentonite and moderate potential for zeolites Includes 15,830 acres of nominated ACMP.	No impact.
Wildlife	Wildlife habitat preserved. If installation of 2 guzzlers not allowed, opportunity to slightly increase nongame populations would be foregone.	Same as all wilderness in suitable area. Both proposed wildlife guzzlers are in the area recommended suitable.	Habitat for nongame species and mule deer would be enhanced by the installation of 2 guzzlers. Slight increase in nongame population.
Livestock Grazing	Potential increases through management, investment, and allocation of available forage of up to 612 AUMs might be foregone. Use of vehicles for livestock management could be restricted on 14.2 miles of ways.	Potential increases through management and investment of up to 420 AUMs might be foregone. Possible vehicle use restrictions would apply to 6.2 miles of ways.	No effect on potential livestock use and management. Two reservoirs would be constructed, and total forage allocations allowed to increase 612 AUMs.
Recreation Use	Elimination of vehicle-oriented recreation by hunters would be somewhat offset by a slight increase in primitive recreation, with a moderate net reduction in overall use. This use would be displaced to other nearby areas.	Similar to all wilderness, but vehicle-oriented recreation would be allowed on 4,150 acres recommended nonsuitable. A moderate net reduction in overall recreation use would occur.	Development activities would reduce opportunities for primitive types of recreation. Vehicle-oriented recreation would not change. There would be a net reduction in overall recreation use. Recreation use levels would be the highest under this alternative.
Economic Value and Local Income	Decrease in economic value and local personal income by $20,599 and $6,017, respectively, if proposed projects and grazing increase were not allowed and from loss of oil and gas leases. Decrease in economic value by $17,085 and increase in local personal income by $6,028 if proposed projects and grazing increases were allowed, and including loss of oil and gas leases. The maximum increase in transportation costs to livestock operators would be $619.	Decrease in economic value and local personal income by $14,492 and $1,066, respectively, if proposed projects were not allowed and from loss of oil and gas leases. Decrease in economic value by $12,425 and increase in local personal income by $7,278 if proposed projects and grazing increase were allowed, and including loss of oil and gas leases. The maximum increase in transportation costs to livestock operators would be $109.	Increase in economic value and local personal income by $3,514 and $12,045 respectively, from construction of proposed projects and from grazing increases.

wilderness in both the all wilderness and enhanced wilderness alternatives; however, factors which could create substantial manageability problems include mineral development on the 640-acre split-estate inholding and maintenance and redevelopment of existing livestock developments along the eastern boundary. The split estate reserves all minerals except coal, oil and gas to the United States.

Existing livestock developments, including a seeding, reservoirs, fence, buried pipeline and brush control, could be maintained by mechanized equipment if there were no practical alternative. They could also be reconstructed if needed to maintain current levels of livestock grazing. The potential impact of developments on the manageability of the area as wilderness could be substantial.

Rationale for Selection of the Preferred Alternative

The no wilderness/no action alternative is preferred because of the area's high oil and gas potential. Part of the Gerry Mountain WSA was recommended as suitable for wilderness designation in BLM's Brothers Management Framework Plan. Since that time updated minerals data have become available which indicate a high potential for oil and gas. Therefore, all of the Gerry Mountain WSA is recommended nonsuitable as wilderness. While this area generally remains in a natural condition and offers outstanding opportunities for solitude, the wilderness values do not outweigh the value of the area for potential minerals development.

Affected Environment

This section discusses only those activities or resources that influence the character of the study area, or that may be affected by the alternatives.

Wilderness Values

Naturalness

The Gerry Mountain WSA is generally in a natural condition. However, naturalness is limited in the eastern portion of the WSA where there is a 2,660-acre area seeded with crested wheatgrass and containing 9 miles of fence, 8 miles of ways (vehicle routes established and maintained solely by the passage of vehicles), 3.2 miles of buried water pipeline, storage tanks, and water troughs.

Naturalness is also limited in a 1,490-acre area on the north edge of the WSA. This area is separated from the remainder of the WSA by a rimrock cliff and overlooks developments outside of the WSA, including a crested wheatgrass seeding, a bentonite processing plant, active mining claims, ranch buildings, a constructed fire line and a wood pole powerline.

The remaining signs of human activity are dispersed throughout the WSA and include 12 reservoirs, 13.3 miles of fence, 6.2 miles of ways, and 1,680 acres which were once sprayed for brush control.

About 26 percent of the WSA is influenced to varying degrees by man-made features. (The area of influence is an estimate based on the acres within the WSA from which the man-made features can be seen.) They limit naturalness in parts of the WSA; however, topographic and vegetative screening reduce the amount of area where these features can be seen. So, overall they are not substantially noticeable. Some of these signs of human activity (ways and brush spraying) are reverting back to a natural appearing condition.

Opportunities for Solitude or Primitive and Unconfined Types of Recreation

Outstanding opportunities for solitude are available in a large portion of this WSA. Topographic screening, the size and shape of the WSA, and a solid block of public land surface also contribute to the outstanding opportunities for solitude. Many secluded spots are located in the central portion of the WSA, which has a large juniper forest, diverse topography and remoteness from access points.

Opportunities for solitude near the edges of the WSA, particularly the north and east side, are limited by the sights and sounds of vehicle traffic, which averages 9 vehicles per day on the G.I. Ranch road, 7 vehicles per day on the Van Lake road, and 28 vehicles per day on the Camp Creek road.

Hiking, hunting, nature study, sightseeing, photography, and camping are the main recreational opportunities available within the WSA. However, none of these are outstanding due to the limited amount of diversity in topography, vegetation, and wildlife. There are no major travel corridors or physical challenges, due to relatively flat terrain in most of the WSA. Most recreation use in the study area probably would occur around Gerry Mountain and Moon Mountain, because of their higher elevation and their scenic vistas. Gerry Mountain is the major point of topographic interest within the study area, but it is not unique.

Special Features

No special or unique features have been identified within the study area.

Diversity in the National Wilderness Preservation System (NWPS)

According to the Bailey/Küchler system of classifying ecosystems, the Gerry Mountain WSA is located in the Intermountain Sagebrush Province and the potential natural vegetation is sagebrush steppe with juniper. Of the vegetative communities listed in the High Lava Plains and Columbia Basin section of the Oregon Natural Heritage Plan, the WSA contains the western juniper/big sagebrush/bluebunch wheatgrass, big sagebrush/bluebunch wheatgrass, and low sagebrush/Idaho fescue ecosystems.

There are seven standard metropolitan statistical areas with population over 100,000 within 5 hours' driving time of the Gerry Mountain WSA: Medford, Eugene/Springfield, Portland and Salem, Oregon; Richland/Kennewick/Pasco and Yakima, Washington; and Boise, Idaho.

Energy and Mineral Development

Energy and mineral resources were evaluated from geologic data supplemented by a limited amount of geochemical stream sediment sampling by geologists with TERRADATA, a consulting firm under contract with BLM. Technical details of the evaluation are in a TERRADATA report titled "Assessment of Geology, Energy, and Minerals (GEM) Resources, Gerry Mountain Geologic Resource Area." This report is supplemented by a BLM evaluation of the same area.

The WSA is within the Gerry Mountain geologic resource area which has been classified according to a rating system that indicates both the potential for occurrence (geologic favorability) of certain minerals, as well as the quantity and quality of data on which the rating is based (confidence level). A description of the rating system is provided in the Statewide EIS volume.

Oil and gas has a high potential in the study area based on several factors. Two deep exploratory wells have been drilled near the WSA; both had oil and gas shows and they revealed that marine clastic sediments are present beneath the WSA. Other exploratory wells have been drilled within Central Oregon and all have had shows of hydrocarbons. The combination of surface structures, subsurface geology, hydrocarbon shows and persistent exploration efforts all lead to a high potential for oil and gas throughout the entire WSA. As of January 1, 1984, the entire WSA was covered by 12 oil and gas leases and one oil and gas lease application.

A mineral deposit known to exist within the WSA is bentonite, on the north and west sides of the area. These deposits are currently being mined adjacent to the WSA for use as pet absorbent and pond sealant. It is inferred that zeolites occur within the same area as the bentonites. No other mineral deposits are known within the WSA. A portion of the WSA is rated highly favorable for bentonite. This same area is moderately favorable for zeolites.

Table 3 shows the mineral potential classifications for the WSA. Map 4 shows the portion of the WSA rated high for bentonite and moderate (medium) for zeolites.

There were no mining claims and no geothermal leases in the WSA as of January 1, 1984.

The WSA is encompassed by an area that has been nominated as an area of critical mineral potential (ACMP). An ACMP is an area of existing or "de facto" withdrawal (from mineral development) that was nominated by the public as having mineral potential that is important to the local, regional or national economy, or that could become important in the future. ACMPs are used by BLM to reevaluate the withdrawals.

The exposed rocks in the WSA are Quaternary and Tertiary volcanics and volcaniclastic sediments. The subsurface rocks are inferred from oil and gas exploration wells to include Cretaceous marine clastic sediments and pre-Cretaceous marine sediments and metamorphased sediments. Depth to these sediments varies from 1500 to 2500 feet.

Table 3. Classification of Energy and Mineral Potential, Gerry Mountain WSA (OR-5-35)

Commodity	Area	Classification Level	Confidence Level
Metals (zinc,tungsten, beryllium)	Entire WSA	2	B
Diatomite	Entire WSA	2	C
Limestone	Entire WSA	2	C
Zeolites	See map 4	3	C
	Rest of WSA	2	C
Bentonite	See map 4	4	D
	Rest of WSA	2	C
Uranium/Thorium	Entire WSA	1	B
Geothermal	Entire WSA	1	C
Oil/Gas	Entire WSA	4	C
Sodium/Potassium	Entire WSA	2	B
Coal	Entire WSA	1	B
Tar Sands/Oil Shale	Entire WSA	1	B
Sand/Gravel	Entire WSA	2	C
Crushable Rock	Entire WSA	2	C

Legend:
C1ass 1 - Lack of indications of favorability
Class 2 - Low favorability
Class 3 - Moderate favorability
Class 4 - High favorability

Confidence Level A - Insufficient data or no direct evidence
Confidence Level B - Indirect evidence available
Confidence Level C - Direct evidence but quantitatively minimal
Confidence Level D - Abundant direct and indirect evidence

Vegetation

Western juniper is the dominant vegetation in the Gerry Mountain WSA. Understory species include Idaho fescue, bluebunch wheatgrass, Thurber's needlegrass, Sandberg's bluegrass, big and low sagebrush and green rabbitbrush. Lesser amounts of Indian ricegrass, needle and thread grass, and various other shrubs, forbs, and grasses are also present.

The eastern part of the WSA contains a seeding, approximately 2,660 acres in size, which is mostly crested wheatgrass and big sagebrush. Big sagebrush lies between the seeding and the predominately western juniper types to the west.

Vegetation of the WSA is predominately mid-seral. (Seral refers to the stage of ecological condition based on the difference between the present plant community and climax vegetation the relatively stable, final stage in plant succession). Past grazing practices combined with fire control have caused an increase in sagebrush and a large invasion of western juniper. The majority of the western juniper vegetation consists of smaller trees less than 150 years old. Large, old trees are present in a few well-defined communities indicating climax juniper sites.

The potential climax vegetation of the WSA is primarily bunchgrass, either bluebunch wheatgrass or Idaho fescue, with lesser amounts of sagebrush. On some sites, western juniper is the climax overstory species.

Wildlife

Game animals in the study area include mule deer, and occasionally antelope, California valley quail, and mourning dove. Many small mammals and nongame birds also inhabit the area.

There are no wildlife projects in the WSA; however, 2 guzzlers (small wildlife watering devices) are proposed which would benefit mule deer and nongame species such as coyotes, chipmunks, finches, and Townsend solitaires.

Livestock Grazing

Portions of two grazing allotments lie within the Gerry Mountain WSA. Table 4 summarizes existing and potential livestock use in AUMs (animal unit months, the amount of forage needed to sustain one cow and calf, or equivalent animals for one month).

Existing livestock developments (among the man-made features listed in the Naturalness section) include 9 miles of fence, 3.2 miles of buried pipeline, storage tanks, water troughs, ranch buildings, and seeded and brush control areas.

Proposed developments include 2 reservoirs. The reservoirs would allow an increase of 357 AUMs through management, such as improved pasture rotation. In addition, a total of 255 AUMs of livestock forage in the Gerry Mountain WSA is currently available but has not yet been allocated. Existing plans propose to allocate this forage to livestock. No construction would be necessary to allocate this forage.

Livestock operators use motor vehicles on ways in the WSA, most of which are access routes for pipeline maintenance in the seeded area and reservoir inspection and maintenance. Due to the topography and lack of vehicular access in the western portion of the WSA, almost all livestock management there is accomplished on horseback. During periods of livestock use, operators make

Table 4. Existing and Potential Livestock Use, Gerry Mountain WSA (OR-5-35)

Grazing Allotment	Licensed AUMs in Allot.	Period of Use	Percent of Allot. in WSA	Current Actual Use in WSA (AUMs)	Available But Potential Increase in WSA (AUMs)	Unallocated Forage in WSA (AUMS)
Clover Cr. (No. 0070)	423	4/16-11/15	49	207	61	0
Cold Spgs (No. 0009)	2,554	4/16-10/31	62	1,319	296	255
TOTAL	2,977			1,526	357	255

almost daily trips by vehicle into the seeded area to check the pipeline system. For the remainder of the WSA, use of motor vehicles by the operators is probably limited to 10 to 15 trips per year.

Recreation Use

The Gerry Mountain WSA historically has been used by vehicle-oriented recreationists, primarily hunters. The majority of recreation use in the WSA is vehicle-oriented and is confined to the 14.2 miles of ways in the WSA. Primitive recreation use in the WSA includes sightseeing, hiking and photography. Levels of recreation use have increased from 2 to 5 percent per year since 1979. Limited amounts of off-road vehicle use occurs in the northern, eastern and southern portions of the WSA; however, rocky terrain and topography restrict this activity.

Economic Value and Local Income

Livestock grazing, recreation, and oil and gas leases are resource outputs which generate economic activity in this WSA. As of January 1, 1984, there were no geothermal leases on the WSA.

Economic value and local personal income generated from existing resource outputs of these lands are presented in table 5. The terms economic value and local personal income are discussed in the Statewide EIS volume.

Environmental Consequences

This section discusses the environmental consequences of implementing each of the alternatives. Resources and activities not significantly affected by any of the alternatives are not discussed. General impact conclusions applicable to all WSAs, including impact conclusions based on speculative future developments (developments which are possible, but are not currently proposed), are discussed in the Statewide EIS volume. That volume also discusses certain assumptions that were made for this analysis.

Effects on Wilderness Values

Under the **all wilderness alternative**, all 19,980 acres of public land in the WSA would be added to the National Wilderness Preservation System (NWPS). The juniper and sagebrush slopes of Gerry Mountain, Moon Mountain, Mule Point and the surrounding hills would be preserved in essentially their present condition. Under this alternative, however, wilderness designation would not prevent mineral development on the 640-acre parcel of split-estate land in the WSA. If development were to occur it would have an adverse effect on the naturalness and solitude of this portion of the WSA. Maintenance of the livestock facilities and livestock management activities along the eastern boundary would also detract from the opportunities for solitude and primitive recreation in the eastern part of the WSA.

Closure of 14.2 miles of ways under the all wilderness alternative would enhance naturalness and opportunities for solitude and primitive recreation.

The **partial alternative** would add 15,830 acres to the NWPS. The effects of this alternative would be similar to the all wilderness alternative for the portion of the WSA recommended as suitable. Closure of 6.2 miles of ways under this alternative would allow the ways to revegetate and enhance the naturalness of the area. Elimination of vehicle use on the ways would improve opportunities for

Table 5. Economic Value and Local Personal Income Generated Annually, Existing Program, Gerry Mountain WSA (OR-5-35) (1981 price levels)

Resource Output	Unit of Measure	Quantity	Economic Value	Local Personal Income Generated
Grazing	AUM	1,526	$11,506	$26,400
Recreation (incl. hunting)	RVD	Unknown	Unknown	Unknown
Oil & gas leases	Acres	19,980	19,980	6,017
Total			31,486	32,417

solitude and primitive recreation. If minerals in the split-estate inholding were developed, wilderness values would be adversely affected.

In the area recommended nonsuitable, wilderness values could also be adversely affected by other surface disturbing activities such as vehicle-oriented recreation on 8 miles of ways and mineral exploration and development. Impacts on wilderness values under this alternative would be minor because the portions recommended nonsuitable have a limited number of wilderness values.

Under the **no wilderness/no action alternative**, naturalness and opportunities for solitude and primitive recreation would be adversely affected by vehicle-oriented recreation use. Oil and gas and bentonite both have high potential in this area. If mining, or oil and gas development occurred, it would substantially impair naturalness and opportunities for solitude and primitive recreation.

Effects on Energy and Mineral Development

Areas designated wilderness would be withdrawn from mineral exploration and development: 19,980 acres under the **all wilderness alternative** and 15,830 acres under the **partial alternative**.

These withdrawals would include the area rated high for oil and gas and the nominated ACMP, which encompass the entire WSA. Both portions of the WSA rated high for bentonite and moderate for zeolites totaling 1,460 acres would be withdrawn under the all wilderness alternative; the partial alternative would withdraw only one of these portions, totaling 760 acres.

No acreage would be withdrawn under the **no wilderness/no action alternative**.

Effects on Wildlife

Wildlife habitat would be preserved in areas designated wilderness.

Under the **all wilderness or partial alternatives**, the two proposed wildlife guzzlers might or might not be allowed depending on a site-specific assessment of whether they would conform with Wilderness Management Policy. If not allowed, an opportunity to increase nongame populations slightly could be foregone under these alternatives.

Under the **no wilderness/no action alternative**, wildlife guzzlers to enhance wildlife habitat by providing additional water sources would be allowed, resulting in a slight increase in nongame populations.

Effects on Livestock Grazing

Under the **all wilderness alternative**, the 255 AUMs of currently available but unallocated livestock forage might or might not be allocated, depending on a site-specific assessment of whether the allocation conformed with Wilderness Management Policy. The proposed reservoirs might or might not be allowed depending on a site-specific assessment of whether they conform with Wilderness Management Policy. If not allowed, the potential increase of 255 AUMs of unallocated forage and 357 AUMs through management and projects would be foregone. Altogether, opportunities to increase licensed forage by as much as 612 AUMs could be foregone.

The two reservoirs have a benefit/cost ratio greater than 1:1.

All 14.2 miles of ways would be closed under this alternative resulting in possible restrictions on use of motor vehicles for livestock management, unless there were no practical alternatives. However, the effect of this on livestock management would not be significant.

Under the **partial alternative**, the effects on livestock grazing would be similar to the all wilderness alternative except in relation to use of vehicles. While vehicular access to a short pipeline (less than .1 mile inside the WSA) in the extreme southwest portion of the area could be limited, 8 miles of existing ways would remain open to motor vehicles, allowing access to the majority of the livestock water system in the WSA.

Of the total 357 AUMs potential increase through management and projects in the WSA, 245 AUMs would be within the area recommended suitable as wilderness under this alternative. Similarly, 175 AUMs of available but unallocated forage is within the suitable recommendation. Therefore, opportunities to increase forage by as much as 420 AUMs could be foregone. The potential increase of 192 AUMs in the portion recommended nonsuitable would be realized.

Under the **no wilderness/no action alternative**, there would be no effect on livestock management within the WSA. Forage allocation would be projected to increase from 1,526 AUMs to 2,138 AUMs through management (pasture rotation) and allocation of available forage.

Effects on Recreation Use

Under the **all wilderness alternative**, vehicle-oriented recreation would be eliminated in the WSA. Primitive recreation would be expected to increase slightly. Vehicle-oriented recreation is expected to be displaced into other nearby areas or partly substituted with primitive recreation. Some vehicle-oriented recreationists may continue to use the WSA, traveling by foot or horseback rather than vehicle. Others will find nearby areas where vehicle use is permitted. The net impact of this alternative on all recreation would be a moderate overall reduction in use.

The **partial alternative** would maintain the outstanding opportunities for primitive recreation in the area recommended suitable. Motor vehicle use could occur in the area recommended nonsuitable. However, vehicle access on 1,490 acres in the northwestern portion is not very likely, due to steep, rocky terrain. The effect of this alternative would be a moderate decrease in levels of vehicle-oriented recreation, primarily hunting, and a slight increase in primitive recreation. A moderate net reduction in overall recreation use would probably occur.

Under the **no wilderness/no action alternative**, there would be no impact on vehicle-oriented recreation. Primitive recreation would decline moderately as a result of vehicle-oriented recreation use and construction of proposed livestock and wildlife projects, since human and mechanical activity would increase. There would be an net decrease in overall recreation use under this alternative.

Effects on Economic Value and Local Income

The economic effects for the alternatives are presented in tables 6 and 7. Table 6 shows the effects on economic value and table 7, the effects on local personal income. It is not known at this time whether oil and gas development might be conducted, or whether individual proposed

Table 6. Effects of Alternatives on Annual Economic Value, Gerry Mountain WSA (OR-5-35) (1981 price levels)

Item	Unit of Measure	All Wilderness	Partial	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS				
Grazing:				
Adjustments[1]	AUM	0 to +255	+80 to +255	+255
Management [2]	AUM	0 to +157	+112 to +157	+157
Investment [3]	AUM	0 to +200	0 to +200	+200
Big game hunting [4]	RVD	0 to +9	0 to +9	+9
Upland game hunting [4]	RVD	0 to +9	0 to +9	+9
Nongame wildlife [4]	RVD	0 to +10	0 to +10	+10
Oil & gas leases	Acres	-19,980	-15,830	0
VALUE OF PROPOSED INVESTMENTS [5]				
Grazing	$	0 to +1,170	0 to +1,170	+1,170
Big game hunting	$	0 to +184	0 to +184	+184
Upland game hunting	$	0 to +240	0 to +240	+240
Nongame wildlife	$	0 to +362	0 to +362	+362
Total [6]	$	0 to +1,956	0 to +1,956	+1,956
Investments [7]	$	0 to -1,549	0 to -1,549	-1,549
Net economic value	$	0 to +407	0 to +407	+407
VALUE OF OTHER EXPECTED CHANGES IN OUTPUTS				
Grazing:				
Adjustments	$	0 to +1,923	+603 to +1,923	+1,923
Management	$	0 to +1,184	+844 to +1,184	+1,184
Oil and gas leases	$	-19,980	-15,830	0
Reduced access[8]	$	-619	-109	0
Total	$	-20,599 to -17,492	-14,492 to -12,832	+3,107
VALUE OF TOTAL EXPECTED CHANGES IN OUTPUTS				
All categories	$	-20,599 to -17,085	-14,492 to-12,425	+3,514

[1] Adjustments to use currently available but unallocated livestock forage.

[2] Expected future increases due to improved management that is not dependent on investments.

[3] Expected future increases due to range improvement investments.

[4] Expected future increases from proposed structural wildlife projects.

[5] Structural projects involving up to $58,059 total expenditures, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

[6] Detail may not sum to "Total" due to rounding.

[7] Average annual cost of investment expenditures amortized at 7.8% over 50-year period.

[8] Additional cost (shown as negative value) due to restriction of vehicular access for livestock operator.

Table 7. Effects of Alternatives on Local Personal Income, Gerry Mountain WSA (OR-5-35) (1981 price levels)

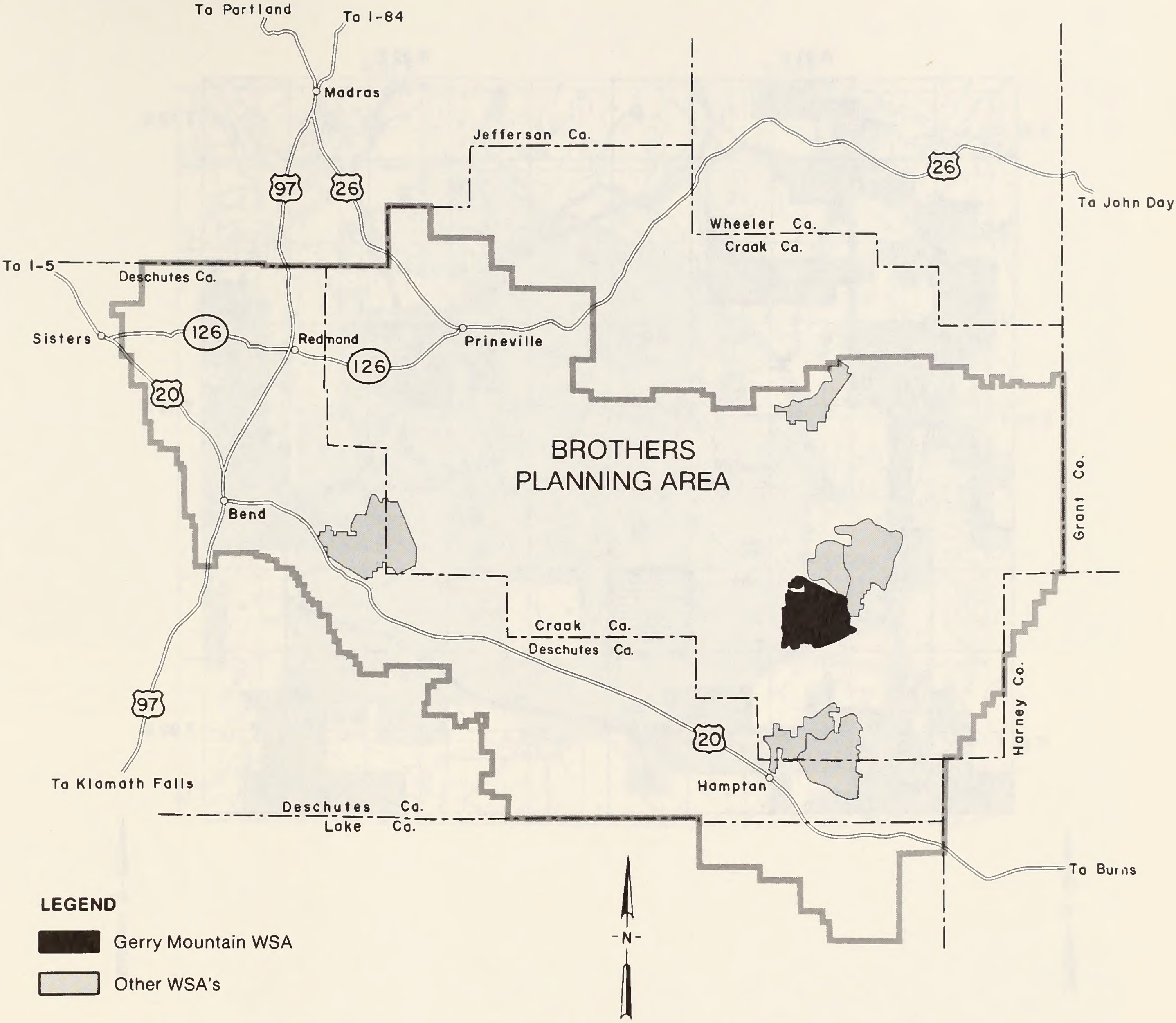
Item	Unit of Measure	All Wilderness	Partial	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS				
Grazing:				
Adjustments [1]	AUM	0 to +255	+80 to +255	+255
Management [2]	AUM	0 to +157	+112 to +157	+157
Investment [3]	AUM	0 to +200	0 to +200	+200
Big game hunting [4]	RVD	0 to +9	0 to +9	+9
Upland game hunting [4]	RVD	0 to +9	0 to +9	+9
Nongame wildlife [4]	RVD	0 to +10	0 to +10	+10
Oil & gas leases	Acres	-19,980	-15,830	0
INCOME FROM PROPOSED INVESTMENTS [5]				
Grazing	$	0 to +3,460	0 to +3,460	+3,460
Big game hunting	$	0 to +98	0 to +98	+98
Upland game hunting	$	0 to +151	0 to +151	+151
Nongame wildlife	$	Unknown	Unknown	Unknown
Construction activity [6]	$	0 to +2,191	0 to +2,191	+2,191
Total [7]	$	0 to +3,709	0 to +3,709	+3,709
INCOME FROM OTHER EXPECTED OUTPUT CHANGES				
Grazing:				
Adjustments	$	0 to +5,620	+1,763 to +5,620	+5,620
Management	$	0 to +2,716	+1,938 to +2,716	+2,716
Oil and gas leases	$	-6,017	-4,767	0
Total [7]	$	-6,017 to +2,319	-1,066 to +3,569	+8,336
INCOME FROM ALL OUTPUT CHANGES				
All categories [7]	$	-6,017 to +6,028	-1,066 to +7,278	+12,045

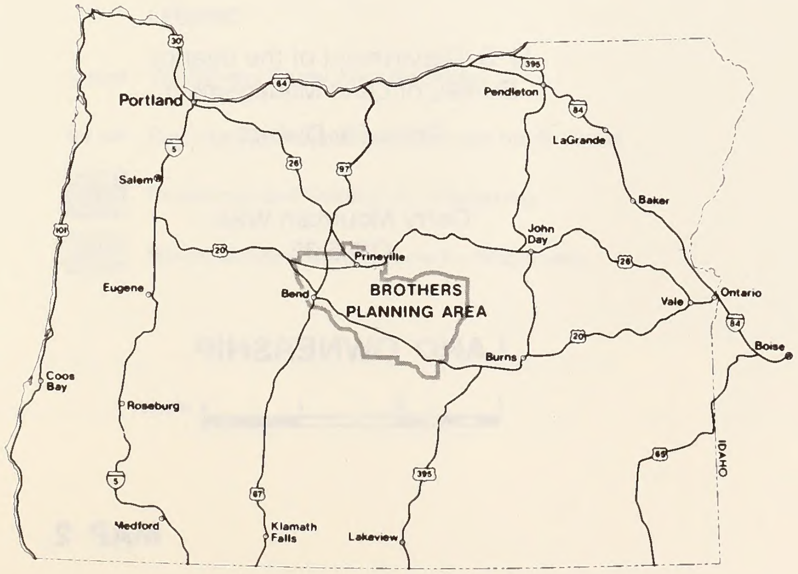
[1] Adjustments to use currently available but unallocated livestock forage.
[2] Expected future increases due to improved management that is not dependent on investments.
[3] Expected future increases due to range improvement investments.
[4] Expected future increases from proposed structural wildlife projects.
[5] Structural projects involving up to $58,059 total expenditures, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.
[6] Local personal income generated annually during assumed 5-year construction period. This amount cannot be added to the income resulting from grazing and hunting activity because it is not sustained over the analysis period.
[7] Detail may not sum to "Total" due to rounding. Total omits income from construction which is limited to 5-year period. See footnote 6.

structural developments, such as the reservoirs and catchments proposed for this WSA, would be constructed if the area were designated wilderness; nor is it known if the grazing increases would be allowed.

The column for each wilderness alternative shows the effects as a range of values dependent upon whether oil and gas development, structural improvements, and/or grazing adjustments were allowed.

Currently, there is considerable dependence on vehicles for frequent checking of pipelines in the study area. The all wilderness alternative would restrict such vehicle use unless there were no practical alternative. The maximum impact from road closures upon the grazing operator in the WSA would be an increase in cost of about $619 per year.





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Bureau of Land Management

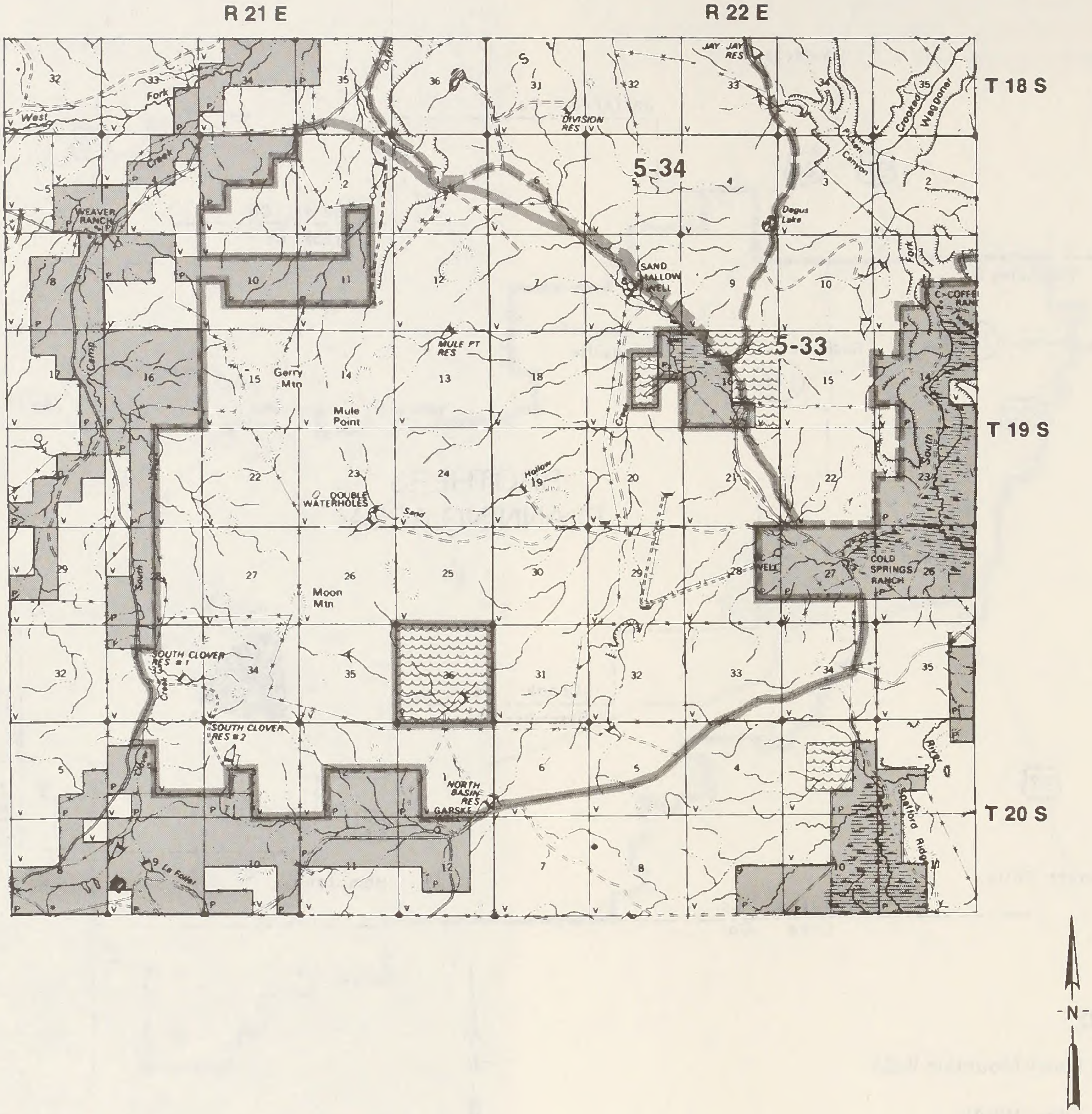
Prineville District

Gerry Mountain WSA
OR-5-35

LOCATION MAP

10 0 10 MILES

MAP 1



LEGEND

▬ Wilderness Study Area Boundary

▬ ▬ Boundary of Adjacent Wilderness Study Areas

☐ Bureau of Land Management

▩ Private

▤ BLM Surface-State or Private Subsurface (Split Estate)

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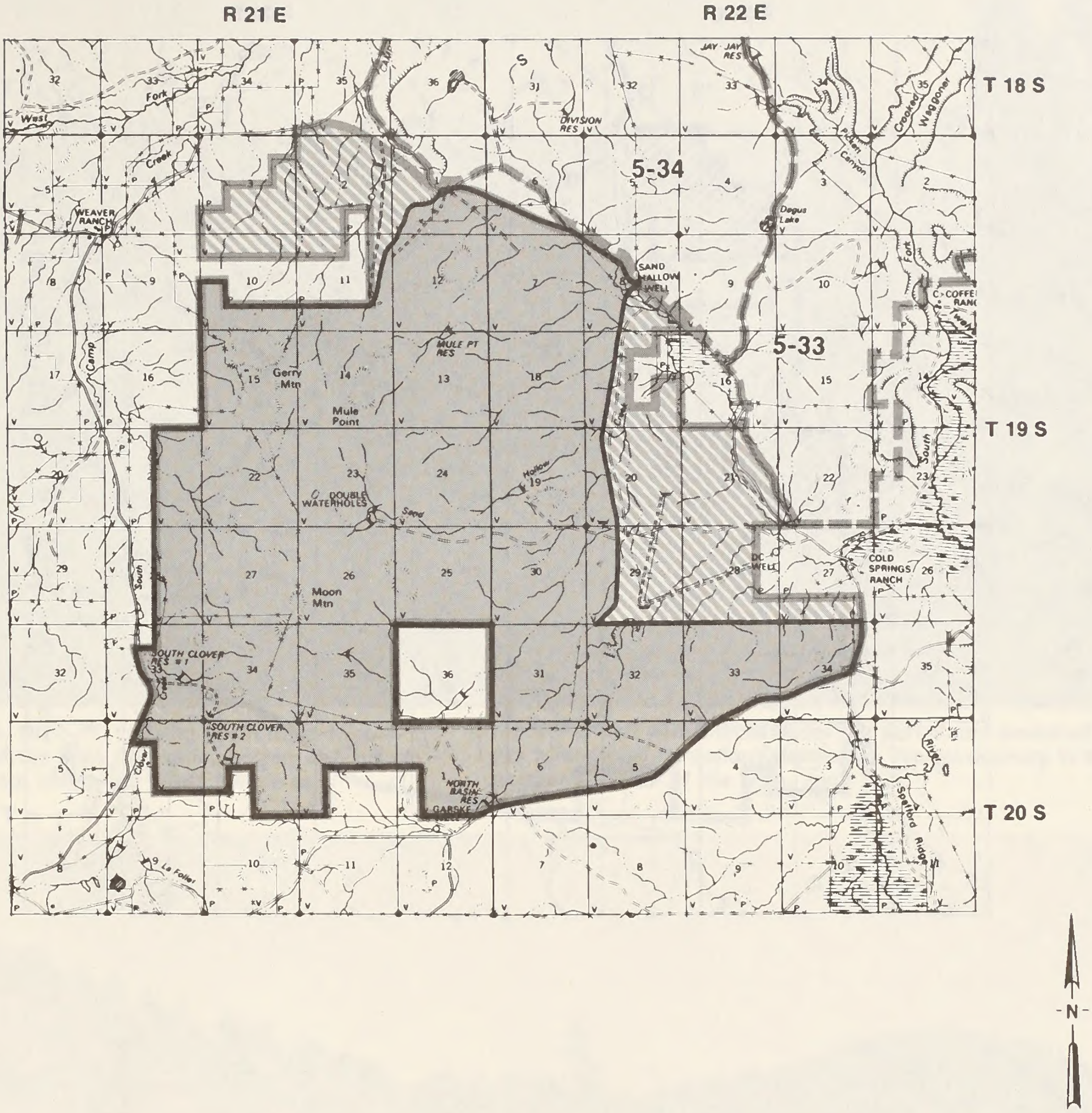
Prineville District

Gerry Mountain WSA
OR-5-35

LAND OWNERSHIP

1 0 1 2 MILES

MAP 2



LEGEND

▬ Wilderness Study Area Boundary

╍ Boundary of Adjacent Wilderness Study Areas

■ Recommended Suitable for Wilderness

▨ Recommended Non-suitable for Wilderness

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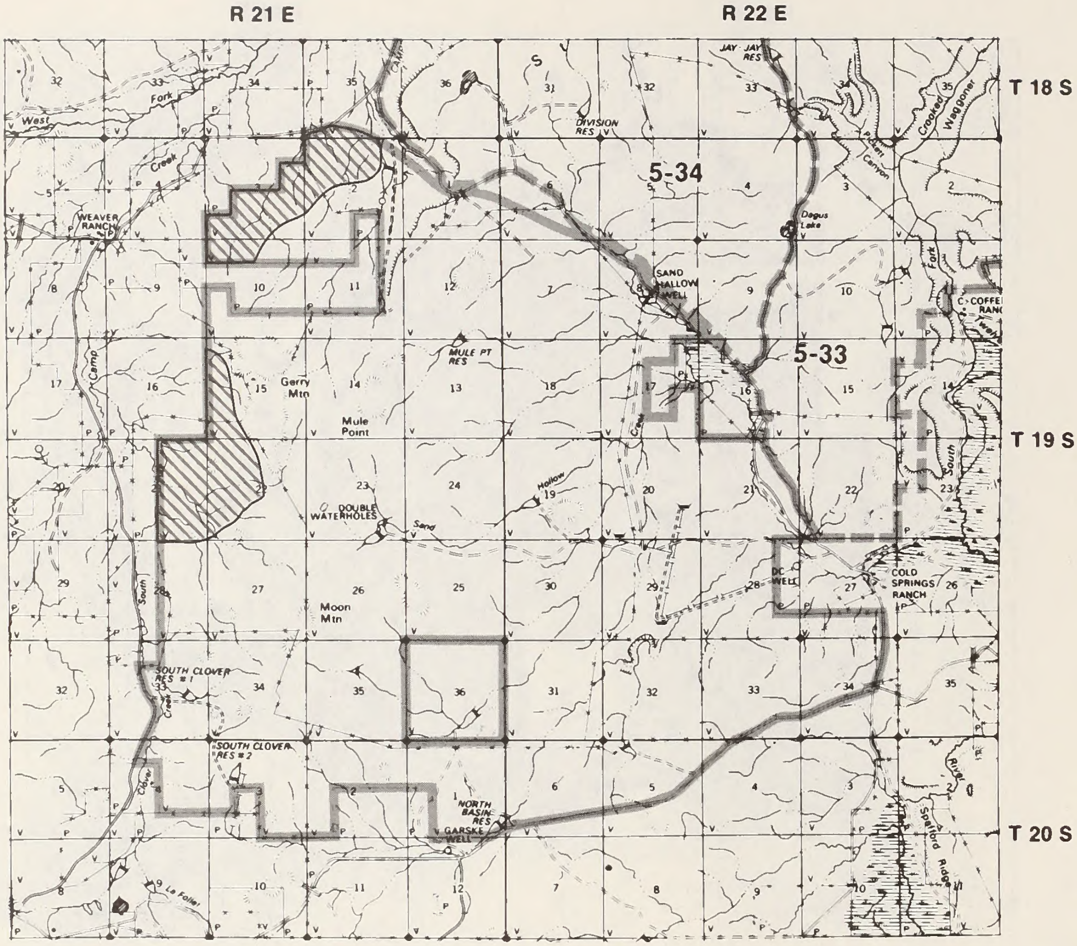
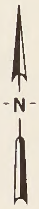
Gerry Mountain WSA
OR-5-35

PARTIAL ALTERNATIVE





▨ **High Potential (4D) for Bentonite**
Medium Potential (3C) for Zeolites

Entire WSA:
High Potential (4C) for Oil and Gas

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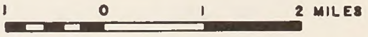
Gerry Mountain WSA
OR-5-35

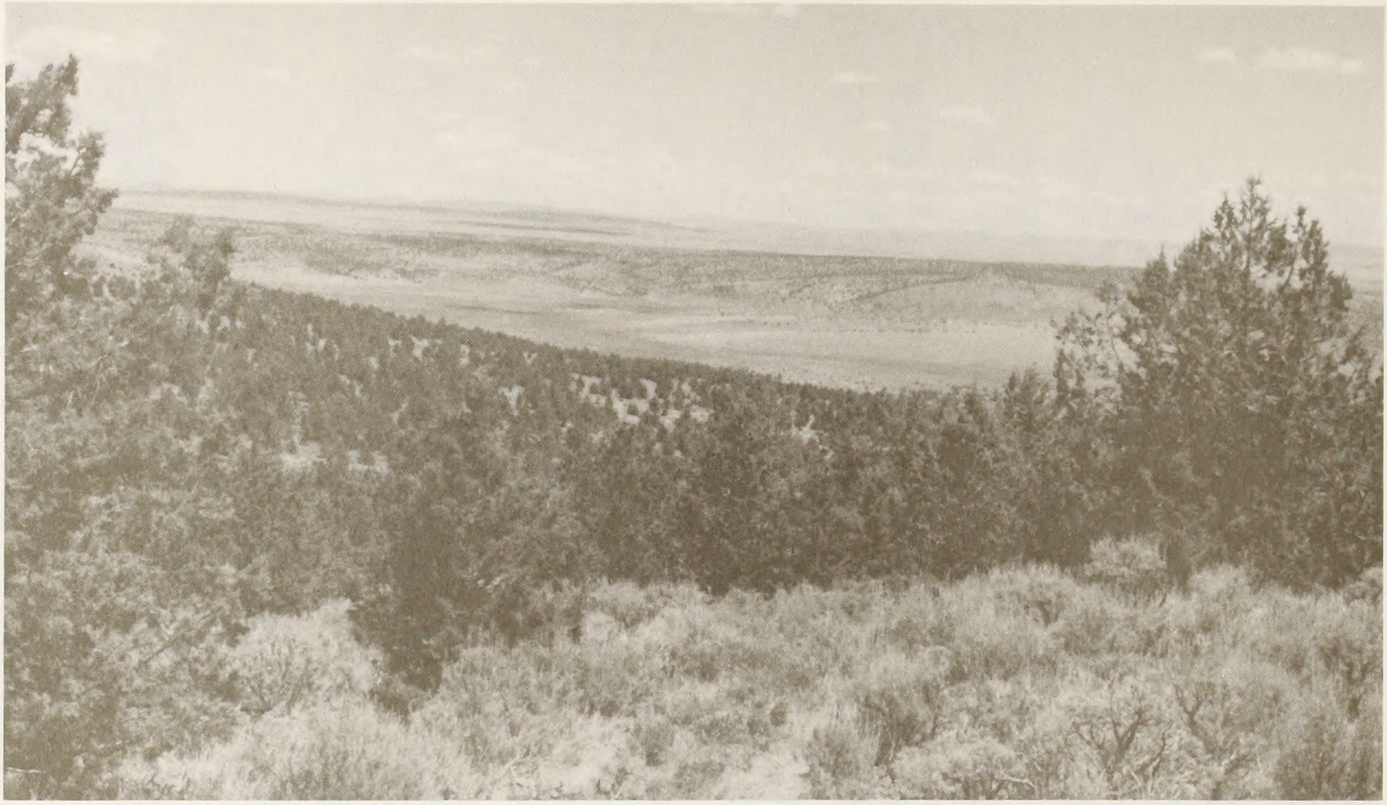
MEDIUM OR HIGH POTENTIAL MINERAL OR ENERGY RESOURCES



MAP 4

Gerry Mountain WSA, OR-5-35. Looking north toward the northern boundary of the WSA (the valley bottom and hills in the background are not within the WSA). Within area recommended nonsuitable under the partial and preferred (no wilderness/ no action) alternative. Typical scenery in the northern portion of the WSA. June 1979.

Gerry Mountain WSA, OR-5-35. Looking south toward Mule Point in the northwestern portion of the WSA. Within area recommended suitable under the partial alternative and nonsuitable under the preferred (no wilderness/no action) alternative. Typical scenery in the northern portion of the WSA. June 1979.



Gerry Mountain WSA, OR-5-35. Looking east toward the G.I. Ranch Road (the background is not within the WSA). Within area recommended nonsuitable under the partial and preferred (no wilderness/no action) alternative. Typical scenery of the eastern and central portions of the WSA. June 1979.

Hampton Butte (OR-5-42) and Cougar Well (OR-5-43) Wilderness Study Areas

General Description of Study Areas

The Hampton Butte and Cougar Well wilderness study areas (WSA) are in Crook and Deschutes Counties, approximately 60 miles southeast of Bend, Oregon, and about 180 miles southeast of Portland, Oregon. U.S. Highway 20 is less than 4 miles south of the two study areas (see map 1).

Cougar Well WSA is a roughly rectangular-shaped unit with 17,315 acres of public land (see map 2). Within the WSA are 800 acres of private land and 1,120 acres of split-estate inholdings (federally managed surface, private or state-owned subsurface mineral rights). Public land interspersed with a few tracts of privately owned land surrounds the WSA. The Hampton Butte WSA, immediately to the west and separated from the Cougar Well WSA by a BLM-maintained road, is an irregularly shaped unit. There are 10,600 acres of public land in the WSA. It is surrounded by public and private land.

In addition, there are 160 acres of private land at the end of a dead-end road in the Hampton Butte WSA and 240 acres of private land at the end of a dead-end road in the Cougar Well WSA. The parcels are not inside the WSAs because the WSA boundaries extend along the dead-end roads, but both parcels are surrounded by BLM land.

The eastern half of Cougar Well WSA slopes toward the west and is bisected by a small canyon. In the western portion, low foothills join a series of minor mountains known as Hampton Buttes. Vegetation is a big sagebrush bunchgrass community.

In the Hampton Butte WSA, a series of foothills rise to a rugged Columbia River basalt rim on the edge of a large plateau in the south-central portion of the WSA. Several smaller buttes in the southern portion of the area are part of the Hampton Buttes, located northwest of the WSA. Dense stands of juniper dominate the southern portion. The understory is sagebrush, rabbitbrush, and bitterbrush.

The western and southern boundaries of the Cougar Well WSA are a combination of BLM-maintained road and a privately maintained road. The eastern and northern boundaries are a combination of a county-maintained and a BLM-maintained road and adjacent private property. Two dead-end roads totaling 5.2 miles enter the Cougar Well WSA, forming part of the boundary.

Boundaries on all sides of the Hampton Butte WSA are formed by a combination of BLM-maintained roads and private property. One dead-end road enters the Hampton Butte WSA, for 1.4 miles, forming part of the boundary.

There is no perennial water within either WSA except for some scattered springs in Hampton

Butte; however, there are 5 reservoirs and a livestock water pipeline.

Interrelationships

All of the Cougar Well and Hampton Butte WSAs fall within lands which were ceded to the U.S. Government by the Warm Springs Indian Tribe by ratified treaty. The treaty reserved to the Indians rights for hunting, fishing and gathering in usual and accustomed places and grazing livestock on unclaimed lands.

Issues

Issues relating to each WSA were raised by BLM and the public during the wilderness inventory and EIS planning and scoping process. These issues concern both the effects of wilderness designation on existing and potential land uses or resources in the WSA, as well as the effects of existing and potential land uses or resources on wilderness values. Land uses or resources raised as issues specifically for these WSAs include:

- proposed livestock and wildlife projects in the WSA,
- use of vehicles for livestock management, and
- existing oil and gas leasing and future exploration and development.

Description of the Alternatives

The following alternatives are analyzed:

- all wilderness
- enhanced wilderness
- no wilderness/no action (preferred alternative)

A partial alternative is not analyzed because no feasible opportunity exists to reduce conflicts of wilderness designation with other resource uses by recommending portions of the WSAs as suitable and still retain necessary wilderness qualities.

An opportunity exists to close the BLM-maintained road between the Cougar Well and Hampton Butte WSAs and manage the two areas as a single unit, if they were both designated as wilderness. This is analyzed in the enhanced wilderness alternative.

All Wilderness

Under the all wilderness alternative, 17,315 acres of public land in the Cougar Well WSA and 10,600 acres of public land in the Hampton Butte WSA would be recommended suitable as wilderness and managed as separate wilderness areas (see map 2). Vehicle use would continue on all roads which presently form the boundaries of the WSAs, including the dead-end roads.

For purposes of analysis, this alternative assumes the 1,200 acres of private inholdings and the 1,120 acres of split-estate inholdings would not be acquired.

Enhanced Wilderness

Under the enhanced wilderness alternative, both the Cougar Well WSA (17,315 acres) and the Hampton Butte WSA (10,600 acres) would be recommended suitable as wilderness and combined to form one wilderness area (see map 3). This combination would require closing 7 miles of road between the two WSAs. An attempt would be made to acquire 2,320 acres of private and split-estate inholdings scattered throughout both WSAs. If the inholdings were acquired, the combined wilderness area would contain 30,235 acres. All 6.6 miles of dead-end road protruding into the Cougar Well and Hampton Butte WSAs would also be closed. If private land at the end of the dead-end road were not acquired, the land owner would be assured adequate access.

No Wilderness/No Action (Preferred Alternative)

Under the no wilderness/no action alternative, both WSAs would be recommended as nonsuitable for wilderness designation. This alternative represents the situation most likely to occur if the area is not designated wilderness. The area would be managed according to the current land use plan, which includes the following features relevant to this analysis:

- construction of proposed livestock and wildlife projects, including brush control and water developments,

- continued availability for mineral exploration and development, and

- continued use of motor vehicles.

Table 1 summarizes the proposed management of the WSA under each alternative.

Table 2 summarizes the environmental consequences of each alternative.

Manageability of the Area as Wilderness

While both the Cougar Well and Hampton Butte WSAs would be manageable as wilderness, there are several factors which detract from the overall manageability of the area. They include 6.6 miles of dead-end roads, parcels of private land totaling 1,200 acres, and 2 parcels of split-estate inholdings, totaling 1,120 acres.

The private inholdings are all used for livestock grazing and do not presently affect the manageability of either WSA. The landowners have not expressed interest in changing the use of this private land and it doesn't appear likely there will be a change in the future; however, land use could change at the discretion of the landowner.

Table 1. Summary of Proposed Management Under Each Alternative, Hampton Butte (OR-5-42) and Cougar Well (OR-5-43) WSAs

Proposed Management	All Wilderness	Enhanced Wilderness	No Wilderness/ No Action
Acres Designated as Wilderness	27,915	27,915	0
Acres Closed to ORVs by Wilderness Designation	27,915	27,915	0
Miles of Roads Closed	0	13.6	0
Miles of Ways Closed	23.8	23.8	0
Acres of Full Fee Estate Acquired[1]	0	1,200	0
Acres of Split Estate Acquired[1]	0	1,120	0
Acres Withdrawn from Mineral Location and Leasing by Wilderness Designation	27,915	27,915	0
Structural Wildlife Projects Developed: Catchments & Guzzlers (number)	0-4	0-4	4
Structural Livestock Projects Developed: Pipelines (miles)	0-7.5	0-7.5	7.5
Vegetative Manipulation for Livestock: Brush Control without Seeding (acres)	0	0	6,560

[1] Upon acquisition, these additional lands would be incorporated into the wilderness area, closed to vehicle use, and withdrawn from mineral location and leasing.

The split-estate inholdings reserve all minerals to the State of Oregon and could be developed at the state's discretion.

Rationale for Selection of the Preferred Alternative

The no wilderness/no action alternative is preferred because of the limited number and range of wilderness values in the areas and the potential for resource uses which would be incompatible with wilderness preservation. The benefits of preserving the wilderness values would be outweighed by the benefits of retaining the option of developing resources, including oil and gas, which has a high potential for occurrence in the area.

Opportunities for solitude are limited because of the shape of the WSAs and the location of private inholdings. Both areas lack outstanding opportunities for primitive and unconfined types of recreation. Neither WSA possesses special features other than crucial antelope range. U.S. Highway 20, a power transmission line, the town of Hampton, a large crested wheatgrass seeding, and the BLM Hampton Guard Station can be seen from several portions of both areas.

Affected Environment

This section discusses only those activities or resources that influence the character of the WSAs, or that may be affected by the alternatives.

Wilderness Values

Naturalness

The majority of the Cougar Well WSA is in an essentially natural condition and appears to be primarily affected by the forces of nature. Man-made features are dispersed throughout various parts of this WSA, except for the southern portion where they are more concentrated, including 1 reservoir, 3.5 miles of fence, 3.1 miles of pipeline and 5.5 miles of ways (vehicle routes established and maintained solely by the passage of vehicles). Man-made features in the remaining portion of this WSA include 2 reservoirs, 4 miles of fence, and 13.5 miles of ways. Some ways are reverting back to a natural appearing condition.

The cumulative effect of these developments is not significant except in the southern portion where

Table 2. Summary of Environmental Consequences of Alternatives, Hampton Butte (OR-5-42) and Cougar Well (OR-5-43) WSAs

Resource or Activity	All Wilderness	Enhanced Wilderness	No Wilderness/No Action (Preferred Alternative)
Wilderness Values	Would add 27,915 acres to the NWPS and assure preservation of wilderness characteristics within both WSAs. However, outside sights and sounds and possible development of the private inholdings and split-estate would adversely affect naturalness and solitude within both WSAs. Closure of 23.8 miles of ways would allow revegetation and enhance wilderness values. Both WSAs are manageable as wilderness.	Would add 30,235 acres to the NWPS, assuming 2,320 acres of private and split-estate inholdings could be acquired. Effects would be same as the all wilderness alternative except that closure of 7 miles of road separating the Hampton Butte and Cougar Well WSAs as well as 6.6 miles of dead-end roads and 23.8 miles of ways within the two WSAs would enhance wilderness values. Acquisition of private and split-estate inholdings would enhance wilderness manageability.	Wilderness characteristics would be adversely affected in small areas by wildlife development projects and by motorized recreation use. Naturalness, solitude, and primitive recreation would also be adversely affected to a substantial degree if oil and gas development occurred. All roads and ways would remain open to vehicle traffic, and the vehicle use would reduce opportunities for solitude and primitive recreation.
Energy and Mineral Development	Development precluded on 17,315 in Hampton Butte and 10,660 in Cougar Well WSAs, including area with high potential for oil and gas (both WSAs).	Development precluded on 27,915 acres, plus an additional 2,320 acres if private and split-estate inholdings are acquired. Includes area with high potential for oil and gas (both WSAs).	No impact.
Vegetation	Vegetation preserved.	Same as all wilderness.	Through proposed brush control, 640 acres in Hampton Butte WSA and 5,920 acres in Cougar Well WSA vegetation diversity would be temporarily reduced. On rest of WSAs, improved grazing management would accelerate succession.
Wildlife	Wildlife habitat preserved. If wildlife guzzlers are not allowed, an opportunity to improve wildlife habitat for antelope, deer and non-game species would be foregone.	Same as all wilderness.	Wildlife guzzlers would improve wildlife habitat for antelope, mule deer, and non-game species.
Livestock Grazing	If projects not allowed, from 25 to 104 AUMs foregone in Hampton Butte WSA. From 258 to 392 AUMs foregone in Cougar Well WSA, with possible reduction of 132 AUMs of licensed use. Some vehicle restrictions could have minimal effect on livestock management in both WSAs.	Same as all wilderness.	Livestock projects would be implemented, resulting in an increase in licensed use of 104 AUMs in Hampton Butte WSA and 392 AUMs in Cougar Well WSA. No reduction in licensed use in Cougar Well WSA would be necessary.
Recreation Use	A reduction in vehicle-oriented recreation use, primarily by hunters, would be partially offset by a slight increase in primitive recreation. Moderate overall reduction in total use.	Similar to the all wilderness alternative, but closure of the road separating Hampton Butte and Cougar Well WSAs and closureof all interior roads would completely eliminate vehicle-oriented recreation use by hunters and other recreationists. Combination of two WSAs would slightly increase primitive recreation, but this is not expected to offset decreases in vehicle-oriented recreation that would occur with the closure of7 miles of boundary road. Overall, effects on recreation use would be similar to all wilderness, with net decrease.	Activities not consistent with wilderness values, would reduce primitive recreation and opportunities for primitive recreation. Vehicle-oriented recreation levels would continue to increase, as in the past.

Economic Value and Local Income	Decreases in annual economic value could range from $28,837 to $30,337, depending on what investments and grazing increases would be allowed in wilderness. Local personal income would decrease by $4,251 to $10,690, depending on the same uncertain factors. Both sets of figures include loss of oil and gas leases, and exclude unknown economic effects of mineral development and unquantified changes in recreation use. The maximum increase in transportation costs to livestock operators would be $523.	Same as all wilderness.	Decrease in annual economic value by $2,954 and increase in local personal income by $9,051 from proposed projects and grazing increases.

they are more concentrated. Some 21 percent of the Cougar Well WSA is influenced to varying degrees by these developments. (The area of influence is an estimate of the acreage within the WSA from which these man-made features can be seen.)

Substantial outside sights and sounds also adversely affect naturalness within the WSA. These include vehicle traffic on Highway 20 located 2-3 miles from the WSA (1,150 vehicles/day), traffic on the G.I. Ranch Road (9 vehicles/day), vehicle traffic leading to an active water pump on private land (Cougar Well), a double woodpole powerline, a large crested wheatgrass field, several buildings and an airstrip in the small town of Hampton 2.5 miles from the WSA, and a maintenance road extending along the WSA's southern boundary.

Although the majority of the Hampton Butte WSA appears to be in a natural condition, man-made features are scattered throughout this WSA. These features include 3.3 miles of fence, 2 reservoirs, 0.9 miles of pipeline, and 4.8 miles of ways. The 2 vehicle ways east of Rhubarb Spring and a way north of this spring are reverting back to a natural appearing condition. Although topographic and vegetative screening lessen the impact of existing developments, the overall naturalness of this WSA is reduced by these developments. Some 2 percent of this WSA is influenced to varying degrees by these developments.

Four significant outside sights and sounds adversely affect the quality of naturalness in the Hampton Butte WSA. These include vehicle traffic on Highway 20 located 1-2 miles from this WSA (1,150 vehicles/day), vehicle use on a road leading to Rhubarb Spring, vehicle use on roads to the west, north and east of this study area, a double woodpole powerline, a large crested wheatgrass field, and several buildings and an airstrip in the small town of Hampton 1.5 miles away from this WSA.

Opportunities for Solitude or Primitive and Unconfined Types of Recreation

The Hampton Butte WSA offers outstanding opportunities for solitude due to rugged topography and dense vegetative screening from juniper trees. However, these opportunities are limited to 3 areas: in a basin northeast of Rhubarb Spring, a small basin 1 mile north of Rhubarb Spring, and a 2- to 3-mile-long canyon in the eastern part of the WSA. The area offering outstanding opportunities for solitude is limited by the narrow shape and limited size of the WSA, a private inholding in its center, and the substantial outside sights and sounds previously described. These factors adversely affect opportunities for solitude, primarily in the southern half of this WSA.

Portions of the Cougar Well WSA offer outstanding opportunities for solitude, due to the area's size, shape and topographic and vegetative screening. However, the 3 private inholdings and two tracts of split-estate land significantly restrict and reduce the quality of solitude on surrounding public lands. Outside sights and sounds described earlier also reduce opportunities for solitude around the area's perimeter and within the southern portion of this WSA. For these reasons, secluded spots are limited to 2 small areas in the central and western portions of the WSA.

Hiking, camping, hunting, sightseeing, nature study, photography and horseback riding opportunities are available within the Hampton Butte WSA. However, they are less than outstanding because of the size and shape of the WSA, the limited vegetative diversity, lack of unique or challenging topographic features, and because of a road leading to a private inholding that confines movement through this WSA.

Opportunities for several types of primitive and unconfined recreational activities are also available within the Cougar Well WSA, including hiking, sightseeing, hunting, photography and horseback riding. However, the quality of these recreational opportunities is less than outstanding due to a limited amount of diversity in wildlife, topography and vegetation. There are no unique points of interest or physical challenges to attract visitors to this area. The private and split-estate inholdings also limit opportunities for unconfined movement through this WSA.

Special Features

A special feature of these WSAs is crucial winter range habitat for antelope, located in the eastern portions of both WSAs.

Diversity in the National Wilderness Preservation System (NWPS)

According to the Bailey/Küchler system of classifying ecosystems, both the Hampton Butte and Cougar Well WSAs are located in the Intermountain Sagebrush Province and have a potential natural vegetation of sagebrush steppe and sagebrush steppe with juniper. The WSAs contain the following ecosystems listed in the High Lava Plains and Columbia Basin section of the Oregon Natural Heritage Plan: western juniper/big sagebrush/bluebunch wheatgrass, big sagebrush/bluebunch wheatgrass, and big sagebrush/Idaho fescue.

The WSAs are located within 5 hours' driving time of seven standard metropolitan statistical areas: Medford, Eugene/Springfield, Salem, and Portland, Oregon; Richland/Kennewick/Pasco and Yakima, Washington; and Boise, Idaho.

Energy and Mineral Development

Energy and mineral resources were evaluated from available geologic data supplemented by a limited amount of geochemical stream sediment sampling by TERRADATA, a consulting firm under contract with BLM. Technical details of the evaluation are found in a TERRADATA report titled "Assessment of Geology, Energy, and Minerals (GEM) Resources, Gerry Mountain Geologic Resource Area (GRA)." This report is supplemented by a BLM evaluation of the same area.

The Hampton Butte and Cougar Well WSAs are within the Gerry Mountain geologic resource area, which has been classified according to a rating system that indicates both the potential for occurrence (geologic favorability) of certain minerals, as well as the quantity and quality of data on which the rating is based (confidence level). A description of the rating system is provided in the Statewide EIS volume.

Oil and gas has a high potential based on several positive factors. Two deep exploratory wells have been drilled near the WSAs; both had oil and gas shows and they revealed that marine clastic sediments are present beneath the WSAs. Other exploratory wells have been drilled within central Oregon and all have had shows of hydrocarbons. The combination of surface structures, subsurface geology, hydrocarbon shows and persistent exploration efforts all lead to a rating of high potential for oil and gas in both WSAs. As of January 1, 1984 both WSAs were covered by oil and gas leases.

Table 3 shows the mineral potential classifications for the WSA.

There were no mining claims and no geothermal leases in either WSA as of January 1, 1984.

Both WSAs are within areas that have been nominated as areas of critical mineral potential (ACMP) because of their oil and gas potential. An ACMP is an area of existing or 'de facto' withdrawal from mineral development that was nominated by the public as having mineral potential important to the local, regional or national economy, or that could become important in the future. ACMPs are used by BLM to reevaluate the withdrawals.

The exposed rocks in the WSAs are Quaternary and Tertiary volcanics and volcaniclastic sediments. The subsurface rocks are inferred from oil and gas exploration wells to include Cretaceous marine clastic sediments and pre-Cretaceous marine sediments and metamorphosed sediments. Depth to these sediments varies from 1500 to 2500 feet. There are no known mineral deposits within either WSA.

Table 3. Classification of Energy and Mineral Potential, Hampton Butte (OR-5-42) and Cougar Well (OR-5-43) WSAs

Commodity	Area	Classification Level	Confidence Level
Metals (Beryllium in Hampton Butte)	All of both WSAs	2	B
Diatomite	All of both WSAs	2	C
Limestone	All of both WSAs	2	C
Zeolites	All of both WSAs	2	C
Bentonite	All of both WSAs	2	C
Uranium/Thorium	All of both WSAs	1	B
Geothermal	All of both WSAs	1	C
Oil/Gas	All of both WSAs	4	C
Sodium/Potassium	All of both WSAs	2	B
Coal	All of both WSAs	1	B
Tar Sands/Oil Shale	All of both WSAs	1	B
Sand/Gravel	All of both WSAs	2	C
Crushable Rock	All of both WSAs	2	C

Legend:
Class 1 - Lack of indications of favorability
Class 2 - Low favorability
Class 3 - Moderate favorability
Class 4 - High favorability

Confidence level A - Insufficient data or no direct evidence
Confidence level B - Indirect evidence available
Confidence level C - Direct evidence but quantitatively minimal
Confidence level D - Abundant direct and indirect evidence

Vegetation

Vegetation within the Hampton Butte WSA is diverse, but it is generally dominated by either western juniper or sagebrush. Western juniper occurs throughout the WSA as scattered trees, dense stands of relatively young trees, and as mature juniper forest. Sagebrush is primarily big sagebrush, but low sagebrush is predominant on the rocky, shallow-soil tables. Understory species include bluebunch wheatgrass, Idaho fescue, Sandberg's bluegrass, bitterbrush, lupine and many other grasses and forbs. Thickets of curl leaf mountain mahogany are present in some areas along rimrock, and isolated stands of aspen are also found.

Big sagebrush is the dominant vegetation within the Cougar Well WSA. Much of the flat to rolling topography is dominated by this species with varying amounts of bluebunch wheatgrass, Idaho fescue, Sandberg's bluegrass, squirreltail grass, lupine, phlox, and rabbitbrush comprising the understory.

Some of the ridges and buttes, especially in the western portion of the WSA, are dominated by western juniper, and low sagebrush occupies a few scattered sites. Several internal basins are dominated by silver sagebrush, but these comprise only a small portion of the WSA.

The potential climax vegetation of both the Hampton Butte and Cougar Well WSAs is generally bunchgrass, Idaho fescue or bluebunch wheatgrass, with lesser amounts of sagebrush. On some sites in Hampton Butte WSA, western juniper is also a climax species. Current ecological stage resulting from past grazing practices and fire control is, for the most part, mid-seral. (Seral refers to a stage of ecological condition based on the difference between the present plant community and climax vegetation, the relatively stable, final stage in plant succession.) About one quarter to one half of the vegetation in the WSAs is in climax.

Wildlife

Game animals in the WSAs include mule deer and antelope. Small mammals and birds inhabit both WSAs.

There are 1,200 acres of crucial antelope winter range in the northeast portion of Hampton Butte WSA, and 8,600 acres in the eastern portion of Cougar Well WSA, containing 40 and 100 antelope, respectively.

There is no perennial water except for some scattered springs in Hampton Butte WSA. One guzzler (small wildlife watering device) in Hampton Butte WSA and 3 guzzlers in Cougar Well WSA are proposed to enhance wildlife habitat by providing water.

Livestock Grazing

Portions of two allotments lie within the Hampton Butte WSA, and a portion of one allotment lies within the Cougar Well WSA. Table 4 summarizes existing and potential livestock use in AUMs (animal unit months, the amount of forage needed to sustain one cow and a calf, or equivalent animals, for one month).

Existing livestock improvements (among the man-made features listed in the Naturalness section) include 3 reservoirs, 7.5 miles of fence, and 3.1 miles of pipeline in the Cougar Well WSA, and 2 reservoirs, 3.3 miles of fence and 0.9 miles of pipeline in the Hampton Butte WSA.

Table 4. Existing and Potential Livestock Use, Hampton Butte (OR-5-42) and Cougar Well (OR-5-43) WSAs

Grazing Allotment	Licensed AUMs in Allot.	Period of Use	Percent of Allot. in WSA	Current Actual Use in WSA (AUMs)	Potential Increase in WSA (AUMs)	Potential Decrease in WSA (AUMs)
Hampton Butte WSA						
G.I. (No. 0044)	10,068	4/16-10/30	6	634	88	0
Hampton (No. 0003)	6,629	4/16-10/30	2	141	16	0
Total Hampton Butte	16,697			775	104	0
Cougar Well WSA						
G.I. (No. 0044)	10,068	4/16-10/30	13	1,350	392	132
Total Cougar Well	10,068			1,350	392	132
Total both WSAs				2,125	496	132

Livestock improvements proposed in the Hampton Butte WSA include 640 acres of sagebrush control through burning, to be located in the northeast corner of the WSA in the G.I. allotment. It is projected that this treatment would produce 25 additional AUMs of livestock forage. Coupled with an additional 79 AUMs through management (improved pasture rotation and scheduled rest), the projected long term allocation of livestock forage from the WSA is 879 AUMs, an increase of 104 AUMs.

Livestock improvements proposed in the Cougar Well WSA include 5,920 acres of brush control through burning and construction of 7.5 miles of pipeline to supply livestock with water from the existing Cougar Well, located on private land in the center of the WSA. It is projected that through this brush control, 258 AUMs of livestock forage could be produced, and an additional 134 AUMs produced through management dependent on the pipeline. If the proposed livestock grazing program is implemented, the long term forage allocation from the WSA would be 1,742 AUMs, an increase of 392 AUMs.

A total of 1.4 miles of dead-end road and 4.3 miles of way are used by livestock operators to maintain pipeline, check livestock water supplies, and supervise livestock. Pipeline is checked with vehicles daily. Operators make probably less than 10 vehicle trips per year in the rest of the WSA. Much of the day-to-day livestock supervision in this WSA is done on horseback, as well as routine fence maintenance and inspection.

In Cougar Well WSA, 5.2 miles of dead-end road and 19 miles of way are used primarily by the livestock operator to check pipelines and reservoirs, to check and repair fences, and to supervise livestock. Due to the predominately gentle topography of this WSA, these vehicle access routes are used almost daily for livestock management, although horses are still important for livestock management. Total vehicle trips into the WSA, excluding checking pipelines, is estimated at 30 to 40 per year.

Recreation Use

Both Cougar Well and Hampton Butte WSAs are used periodically by recreationists, primarily hunters, using vehicles for access. Day hikers and backpackers also use the area to a lesser degree. Use of Cougar Well WSA is slightly less than in Hampton Butte. Vehicle-oriented recreation use is low in the Hampton Butte WSA and recreation activities such as horseback riding, hiking, sightseeing and photography account for low visitation.

Total recreation use in the Cougar Well WSA is low. Practically all vehicle use occurs on existing ways and roads. Recreation use has increased approximately 2 to 5 percent per year since 1979.

Economic Value and Local Income

Resource outputs from these WSAs generating economic activity include grazing, recreation, and oil and gas leases. As of January 1, 1984, there were no geothermal leases on these WSAs.

Economic value and local personal income generated from existing resource outputs of these lands are presented in tables 5a-c. The terms economic value and local personal income are discussed in the Statewide EIS volume.

Table 5a. Economic Value and Local Personal Income Generated Annually, Existing Program, Hampton Butte (OR-5-42) and Cougar Well (OR-5-43) WSAs, Combined (1981 price levels).

Resource Output	Unit of Measure	Quantity	Economic Value	Local Personal Income Generated
Grazing	AUM	2,125	$16,023	$36,763
Recreation (including hunting)	RVD	Unknown	27,915	Unknown
Oil and gas leases	Acres	27,915	27,915	8,406
Total			$43,938	$45,169

Table 5b. Economic Value and Local Personal Income Generated Annually, Existing Program, Hampton Butte WSA (OR-5-42) (1981 price levels)

Resource Output	Unit of Measure	Quantity	Economic Value	Local Personal Income Generated
Grazing	AUM	775	$5,844	$13,408
Recreation (incl. hunting)	RVD	Unknown	Unknown	Unknown
Oil & gas leases	Acres	10,600	10,600	3,192
Total			$16,444	$16,600

Table 5c. Economic Value and Local Personal Income Generated Annually, Existing Program, Cougar Well WSA (OR-5-43) (1981 price levels)

Resource Output	Unit of Measure	Quantity	Economic Value	Local Personal Income Generated
Grazing	AUM	1,350	$10,179	$23,355
Recreation (incl. hunting)	RVD	Unknown	Unknown	Unknown
Oil & gas leases	Acres	17,315	17,315	5,214
Total			$27,494	$28,569

Environmental Consequences

This section discusses the environmental consequences of implementing each of the alternatives. Resources and activities not significantly affected by any of the alternatives are not discussed. General impact conclusions applicable to all WSAs, including impact conclusions based on speculative future developments, (developments which are possible, but are not currently proposed), are discussed in the Statewide EIS volume. That volume also discusses certain assumptions that were made for this analysis.

Effects on Wilderness Values

The **all wilderness alternative** would add all 10,600 acres of public land in the Hampton Butte WSA and all 17,315 acres of public land in the Cougar Well WSA (totaling 27,915 acres) to the National Wilderness Preservation System (NWPS). Each WSA would be managed as a separate wilderness area. Wilderness characteristics of naturalness, opportunities for solitude and primitive recreation, and special features would be preserved in two areas of rolling sagebrush and juniper-covered hills and buttes.

Livestock grazing projects could be developed and oil and gas wells could be drilled on the private and split-estate inholdings. Both types of developments would adversely affect wilderness values on surrounding public lands, as would routes constructed to the inholdings across public lands. (Currently, these inholdings are used for livestock grazing and it doesn't appear likely that land use will change in the near future.) Eliminating vehicle use on 23.8 miles of ways within both WSAs would allow revegetation, enhancing naturalness.

The **enhanced wilderness alternative** would combine both WSAs into a single wilderness area and add 30,235 acres to the NWPS, assuming the 2,320 acres of private and split-estate inholdings could be acquired. This, combined with closure of all dead-end roads and ways and the road between the two WSAs, would enhance naturalness and solitude and also allow more freedom of movement through both WSAs for various primitive types of recreation. However, even with these actions, solitude and primitive recreation would still be adversely affected by outside sights and sounds. Elimination of vehicle use on 23.8 miles of ways would allow revegetation, enhancing naturalness.

Under the **no wilderness/no action alternative**, naturalness and opportunities for solitude and primitive recreation could be adversely affected by vehicle-oriented recreation use and wildlife and livestock projects. If oil and gas development occurred, naturalness, opportunities for solitude and primitive recreation, and the crucial winter range for antelope could be adversely affected to a substantial degree.

Effects on Energy and Mineral Development

Areas designated wilderness would be withdrawn from mineral exploration and development: 17,315 acres in Cougar Well WSA and 10,600 acres in Hampton Butte WSA under the **all wilderness alternative**; and 27,915 acres (both WSAs combined), plus an additional 2,320 acres if the private and split-estate inholdings are acquired, under the **enhanced wilderness alternative**. These withdrawals would include the area rated high for oil and gas, which encompasses both WSAs.

No acreage would be withdrawn under the **no wilderness/no action alternative**.

Effects on Vegetation

Areas designated wilderness would not be subject to most surface disturbing activities, vegetation dependent upon the existing undeveloped environment would thus be maintained.

Under the **no wilderness/no action alternative**, changes in vegetation would occur through brush control (640 acres in Hampton Butte WSA, 5,920 acres in Cougar Well WSA) and through improved pasture rotation. Vegetation diversity would be reduced by temporarily reducing brush and forbs and increasing grasses. Improved pasture rotation would accelerate succession.

Effects on Wildlife

Wildlife habitat would be preserved in areas designated wilderness.

Under the **all and enhanced wilderness alternatives**, the proposed guzzlers (one in Hampton Butte WSA and three in Cougar Well WSA) might or might not be allowed depending on a site-specific assessment of whether they conform with Wilderness Management Policy. If they are not allowed, wildlife distribution would continue to be concentrated around present limited water sources, unless the proposed pipeline is allowed.

Under the **no wilderness/no action alternative**, the guzzlers would be installed resulting in better distribution of wildlife species, including antelope, mule deer, coyotes, and bobcats. In addition, the proposed pipeline would be constructed to provide additional water, further improving wildlife distribution.

Effects on Livestock Grazing

Under the **all and enhanced wilderness alternatives**, opportunities to increase livestock forage production by 25 AUMs in Hampton Butte WSA and 258 AUMs in Cougar Well WSA would be foregone, since proposed sagebrush burning to increase livestock forage would not be allowed. The project in the Hampton Butte WSA has a benefit/cost ratio of at least 1:1. The project in the Cougar Wells WSA has a benefit/cost ratio of less than 1:1.

Pipeline construction proposed in the Cougar Well WSA might or might not be allowed under the all and enhanced wilderness alternatives depending on a site-specific assessment of whether it conforms with Wilderness Management Policy. This project has a benefit/cost ratio greater than 1:1.

Preliminary and inconclusive data show that present grazing use in the Misery Flat pasture of the G.I. Allotment (essentially the east half of the WSA) exceeds grazing capacity by as much as 15 percent. This amounts to 132 AUMs, or about 10 percent of the AUMs allocated in the WSA. To alleviate this overgrazing, it may be necessary to construct the proposed pipeline. If not constructed, it could be necessary to reduce present grazing use by up to 132 AUMs in the WSA. If the pipeline were built, grazing management would improve in the Misery Flat pasture and there would be no need to decrease present grazing use. Over the long term, an additional 134 AUMs of livestock forage would become available. These additional AUMs would be foregone in Cougar Well WSA under the all and enhanced wilderness alternatives if the pipeline were not allowed.

In Hampton Butte WSA an additional 79 AUMs are projected through improved management, not dependent on projects in the WSA. These AUMs might or might not be allocated, depending on a site-specific assessment of whether it conforms with Wilderness Management Policy.

Foregone opportunities to produce livestock forage range from 25 AUMs to 104 AUMs in Hampton Butte WSA, and from 258 AUMs to 524 AUMs in Cougar Well WSA, including the potential for reduction of grazing use of up to 132 AUMs in the Cougar Well WSA.

Effects on livestock grazing under the enhanced wilderness alternative would be the same as under the all wilderness alternative. Under both the all and enhanced wilderness alternatives, ways would be closed; in addition, under the enhanced wilderness alternative, the dead-end roads and the road between the two WSAs would be closed. These closures would have a minimal effect on livestock grazing since the roads could still be used for maintenance of existing range developments.

There would be no effect on livestock management within the WSAs under the **no wilderness/no action alternative**. In Hampton Butte WSA, there would be a projected increase of 104 AUMs through sagebrush burning and improved management. In Cougar Well WSA, the proposed brush control would produce 258 additional AUMs and, through pipeline installation, improved management would produce 134 AUMs in the long term. Total allocation would increase from 775 AUMs to 879 AUMs in Hampton Butte WSA, and from 1,350 AUMs to 1,742 AUMs in Cougar Well WSA. All roads and ways would remain open to vehicles under this alternative.

Effects on Recreation Use

Vehicle-oriented recreation under the **all wilderness alternative** would decrease moderately in the Hampton Butte and Cougar Well WSAs from closure of ways. (Access would continue on the dead-end roads.) This would adversely affect recreationists, primarily hunters, who historically have used motorized vehicles within these WSAs. This vehicle-oriented recreation use probably would be displaced to nearby areas. Opportunities for primitive recreation would be enhanced. Primitive recreation use (hiking, sightseeing, photography, etc.) would increase slightly. There would be a moderate net decrease in overall recreation use in both WSAs under the all wilderness alternative.

Under the **enhanced wilderness alternative**, impacts would be similar to those of the all wilderness alternative, except that road closures would eliminate all vehicle access for recreation activities. Combining the two WSAs would slightly increase primitive recreation above that expected under the all wilderness alternatives; however, road closures would also decrease vehicle-oriented recreation to a greater degree than under the all wilderness alternative, so that there would be a net overall reduction in recreation similar to the all wilderness alternative. Overall, effects on recreation use would be similar to the all wilderness alternative, with a net decrease.

Under the **no wilderness/no action alternative**, vehicle-oriented recreation use would continue to increase as it has in the past. These increases in vehicle-oriented recreation uses, combined with range maintenance activities and wildlife developments, would reduce opportunities for primitive recreation. There would not be any significant impact to vehicle-oriented recreation use, but primitive recreation would decrease.

Effects on Economic Value and Local Income

The economic effects for the alternatives are presented in tables 6a-c and 7a-c. Tables 6a-c show the effects on economic value and tables 7a-c, the effects on local personal income. It is not known at this time whether oil and gas operations might be conducted if these areas were designated wilderness. Also, it is not known if the expected grazing increases or structural developments such as the pipeline and guzzlers proposed for these areas would be allowed under wilderness designation. The columns for the wilderness alternatives show the effects as a range of values dependent upon whether these projects were allowed. It is known that the vegetative manipulation (brush control) projects would not be allowed.

Livestock operators use vehicles frequently for checking pipeline and for other livestock management purposes in these two WSAs. Wilderness designation would restrict such vehicle use unless there were no practical alternative. The impact from road closures under either of the wilderness alternatives would be an increase in cost of about $67 per year in the Hampton Butte WSA and $456 per year in the Cougar Well WSA.

Some additional expense would be incurred under the enhanced wilderness alternative if the proposed private land and split-estate acquisitions were made.

Table 6a. Effects of Alternatives on Annual Economic Value, Hampton Butte (OR-5-42) and Cougar Well (OR-5-43) WSAs Combined (1981 price levels)

Item	Unit of Measure	All Wilderness	Enhanced Wilderness	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS				
Grazing:				
Adjustments[1]	AUM	-132	-132	-132
Management[2]	AUM	0 to +79	0 to +79	+79
Investment[3]	AUM	0 to +266	0 to +266	+549
Big game hunting[4]	RVD	0 to +17	0 to +17	+17
Upland game hunting[4]	RVD	0 to +17	0 to +17	+17
Nongame wildlife[4]	RVD	0 to +20	0 to +20	+20
Oil & gas leases	Acres	-27,915	-27,915	0
VALUE OF PROPOSED INVESTMENTS[5]				
Grazing	$	0 to +1,680	0 to +1,680	+2,768
Big game hunting	$	0 to +368	0 to +368	+368
Upland game hunting	$	0 to +480	0 to +480	+480
Nongame wildlife	$	0 to +725	0 to +725	+725
Total[6]	$	0 to +3,251	0 to +3,252	+4,341
Investments[7]	$	0 to -4,156	0 to -4,156	-6,896
Net economic value	$	-904 to 0	-904 to 0	-2,555
VALUE OF OTHER EXPECTED CHANGES IN OUTPUTS				
Grazing:				
Adjustments	$	-995	-995	-995
Management	$	0 to +596	0 to +596	+596
Oil and gas leases	$	-27,915	-27,915	0
Reduced access[8]	$	-523	-523	0
Total	$	-29,433 to -28,837	-29,433 to -28,837	-399
VALUE OF TOTAL EXPECTED CHANGES IN OUTPUTS				
All categories[9]	$	-30,337 to -28,837	-30,337 to -28,837	-2,954
		(-28,438 to -26,495)	(-28,438 to -26,495)	(+291)

[1] Adjustments for possible reduction in grazing without proposed pipeline. Possible reduction is based on inconclusive data and may not be necessary.

[2] Expected future increases due to improved management that is not dependent on investments.

[3] Expected future increases due to range improvement investments.

[4] Expected future increases from proposed structural wildlife projects.

[5] Vegetative manipulation projects involving $86,374 total expenditures, and structural projects involving $129,034. Amounts shown in the table represent combined results of both types of projects. Including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

[6] Detail may not sum to "Total" due to rounding.

[7] Average annual cost of investment expenditures amortized at 7.875% over 50-year period.

[8] Additional cost (shown as negative value) due to restriction of vehicular access for livestock operator.

[9] See footnote 2. If the grazing adjustment is found to be unnecessary, compensating improvements would not be developed. Investments and grazing adjustments would be zero. The effects of this case are shown in parentheses.

Table 6b. Effects of Alternatives on Annual Economic Value, Hampton Butte WSA (OR-5-42) (1981 price levels)

Item	Unit of Measure	All Wilderness	Enhanced Wilderness[1]	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS				
Grazing:				
Management[2]	AUM	0 to +79	0 to +79	+79
Investment[3]	AUM	0	0	+25
Big game hunting[4]	RVD	0 to +4	0 to +4	+4
Upland game hunting[4]	RVD	0 to +4	0 to +4	+4
Nongame wildlife[4]	RVD	0 to +5	0 to +5	+5
Oil & gas leases	Acres	-10,600	-10,600	0
VALUE OF PROPOSED INVESTMENTS[5]				
Grazing	$	0	0	+138
Big game hunting	$	0 to +92	0 to +92	+92
Upland game hunting	$	0 to +120	0 to +120	+120
Nongame wildlife	$	0 to +181	0 to +181	+181
Total[6]	$	0 to +393	0 to +393	+531
Investments[7]	$	0 to -228	0 to -228	-495
Net economic value	$	0 to +165	0 to +165	+36
VALUE OF OTHER EXPECTED CHANGES IN OUTPUTS				
Grazing:				
Management	$	0 to +596	0 to +596	+596
Oil and gas leases	$	-10,600	-10,600	0
Reduced access[8]	$	-67	-67	0
Total	$	-10,667 to -10,071	-10,667 to -10,071	+596
VALUE OF TOTAL EXPECTED CHANGES IN OUTPUTS				
All categories	$	-10,667 to -9,906	-10,667 to -9,906	+632

[1] Represents effects for this WSA only. See table 6a for combined effects of enhanced wilderness alternative.

[2] Expected future increases due to improved management that is not dependent on investments.

[3] Expected future increases due to range improvement investments.

[4] Expected future increases from proposed structural wildlife projects.

[5] Vegetative manipulation projects involving $8,427 total expenditures, and structural projects involving $7,696. Amounts shown in the table represent combined results of both types of projects, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

[6] Detail may not sum to "Total" due to rounding.

[7] Average annual cost of investment expenditures amortized at 7.875% over 50-year period.

[8] Additional cost (shown as negative value) due to restriction of vehicular access for livestock operator.

Table 6c. Effects of Alternatives on Annual Economic Value, Cougar Well WSA (OR-5-43) (1981 price levels)

Item	Unit of Measure	All Wilderness	Enhanced Wilderness[1]	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS				
Grazing:				
Adjustments[2]	AUM	-132	-132	-132
Investment[3]	AUM	0 to +266	0 to +266	+524
Big game hunting[4]	RVD	0 to +13	0 to +13	+13
Upland game hunting[4]	RVD	0 to +13	0 to +13	+13
Nongame wildlife[4]	RVD	0 to +15	0 to +15	+15
Oil & gas leases	Acres	-17,315	-17,315	0
VALUE OF PROPOSED INVESTMENTS[5]				
Grazing	$	0 to +1,680	0 to +1,680	+2,630
Big game hunting	$	0 to +276	0 to +276	+276
Upland game hunting	$	0 to +360	0 to +360	+360
Nongame wildlife	$	0 to +544	0 to +544	+544
Total[6]	$	0 to +2,859	0 to +2,859	+3,810
Investments[7]	$	0 to -3,928	0 to -3,928	-6,401
Net economic value[8]	$	-1,069 to 0	-1,069 to 0	-2,591
VALUE OF OTHER EXPECTED CHANGES IN OUTPUTS				
Grazing:				
Adjustments	$	-995	-995	-995
Oil and gas leases	$	-17,315	-17,315	0
Reduced access[8]	$	-456	-456	0
Total	$	-18,766	-18,766	-995
VALUE OF TOTAL EXPECTED CHANGES IN OUTPUTS				
All categories[9]	$	-19,835 to -18,766 (-17,771 to -16,589)	-19,835 to -18,766 (-17,771 to -16,589)	-3,586 (-341)

[1] Represents effects for this WSA only. See table 5a for additional effects of enhanced wilderness alternative.

[2] Adjustments for possible reduction in grazing without proposed pipeline. Possible reduction is based on inconclusive data and may not be necessary.

[3] Expected future increases due to range improvement investments.

[4] Expected future increases from proposed structural wildlife projects.

[5] Vegetative manipulation projects involving $77,947 total expenditures, and structural projects involving $121,338. Amounts shown in table represent combined results of both types of projects, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

[6] Detail may not sum to "Total" due to rounding.

[7] Average annual cost of investment expenditures amortized at 7.875% over 50-year period.

[8] Additional cost (shown as negative value) due to restriction of vehicular access for livestock operator.

[9] See footnote 2. If the grazing adjustment is found to be unnecessary, compensating improvements would not be developed. Investments and grazing adjustments would be zero. The effects of this case are shown in parentheses.

Table 7a. Effects of Alternatives on Local Personal Income, Hampton Butte (OR-5-42) and Cougar Well (OR-5-43) WSAs Combined (1981 price levels)

Item	Unit of Measure	All Wilderness	Enhanced Wilderness[1]	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS				
Grazing:				
Adjustments[1]	AUM	-132	-132	-132
Management[2]	AUM	0 to $79	0 to $79	$79
Investment[3]	AUM	0 to $266	0 to $266	$549
Big game hunting[4]	RVD	0 to $17	0 to $17	$17
Upland game hunting[4]	RVD	]0 to $17	0 to $17	$17
Nongame wildlife[4]	RVD	0 to $20	0 to $20	$20
Oil & gas leases	Acres	-27,915	-27,915	0
INCOME FROM PROPOSED INVESTMENTS[5]				
Grazing	$	0 to $4,602	0 to $4,602	$9,497
Big game hunting	$	0 to $185	0 to $185	$185
Upland game hunting	$	0 to $285	0 to $285	$285
Nongame wildlife	$	unknown	unknown	unknown
Construction activity[6]	$	0 to $5,284	0 to $5,284	$10,012
Total[7]	$	0 to $5,072	0 to $5,072	$9,967
INCOME FROM OTHER EXPECTED OUTPUT CHANGES				
Grazing:				
Adjustments	$	-2,284	-2,284	-2,284
Management	$	0 to $1,367	0 to $1,367	$1,367
Oil and gas leases	$	-8,406	-8,406	0
Total[7]	$	-10,690 to -9,323	-10,690 to -9,323	-917
INCOME FROM ALL OUTPUT CHANGES				
All categories[7] [8]	$	-10,690 to -4,251 (-8,406 to -4,251)	-10,690 to -4,251 (-8,406 to -4,251)	$9,051 ($9,051)

[1] Adjustment for possible reduction in livestock grazing without proposed pipeline. Possible reduction is based on inconclusive data and may not be necessary.

[2] Expected future increases due to improved management that is not dependent on investments.

[3] Expected future increases due to range improvement investments.

[4] Expected future increases from proposed structural wildlife projects.

[5] Vegetative manipulation projects involving $86,374 total expenditures, and structural projects involving $129,034. Amounts shown in the table represent combined results of both types of projects. Including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

[6] Local personal income generated annually during assumed 5-year construction period. This amount cannot be added to the income resulting from grazing and hunting activity because it is not sustained over the analysis period.

[7] Detail may not sum to "Total" due to rounding. Total omits income from construction which is limited to 5-year period. See footnote 6.

[8] See footnote 2. If the grazing adjustment is found to be unnecessary, compensating improvements would not be developed. Investments and grazing adjustments would be zero. The effects of this case are shown in parentheses.

Table 7b. Effects of Alternatives on Local Personal Income, Hampton Butte WSA (OR-5-42) (1981 price levels)

Item	Unit of Measure	All Wilderness	Enhanced Wilderness[1]	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS				
Grazing:				
Management[2]	AUM	0 to $79	0 to $79	$79
Investment[3]	AUM	0	0	$25
Big game hunting[4]	RVD	0 to $4	0 to $4	$4
Upland game hunting[4]	RVD	0 to $4	0 to $4	$4
Nongame wildlife[4]	RVD	0 to $5	0 to $5	$5
Oil & gas leases	Acres	-10,600	-10,600	0
INCOME FROM PROPOSED INVESTMENTS[5]				
Grazing	$	0	0	$432
Big game hunting	$	0 to $43	0 to $43	$43
Upland game hunting	$	0 to $67	0 to $67	$67
Nongame wildlife	$	unknown	unknown	unknown
Construction activity[6]	$	0 to $375	0 to $375	$836
Total[7]	$	0 to $110	0 to $110	$542
INCOME FROM OTHER EXPECTED OUTPUT CHANGES				
Grazing:				
Management	$	0 to $1,367	0 to $1,367	$1,367
Oil and gas leases	$	-3,192	-3,192	0
Total[7]	$	-3,192 to -1,825	-3,192 to -1,825	$1,367
INCOME FROM ALL OUTPUT CHANGES				
All categories[7]	$	-3,192 to -1,715	-3,192 to -1,715	$1,909

[1] Represents effects for this WSA only. See table 7a for combined effects of enhanced wilderness alternative.

[2] Expected future increases due to improved management that is not dependent on investments.

[3] Expected future increases due to range improvement investments.

[4] Expected future increases from proposed structural wildlife projects.

[5] Vegetative manipulation projects involving $8,427 total expenditures, and structural projects involving $7,696. Amounts shown in the table represent combined results of both types of projects, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

[6] Local personal income generated annually during assumed 5-year construction period. This amount cannot be added to the income resulting from grazing and hunting activity because it is not sustained over the analysis period.

[7] Detail may not sum to "Total" due to rounding. Total omits income from construction which is limited to 5-year period. See footnote 6.

Table 7c. Effects of Alternatives on Local Personal Income, Cougar Well WSA (OR-5-43) (1981 price levels)

Item	Unit of Measure	All Wilderness	Enhanced Wilderness[1]	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS				
Grazing:				
Adjustments[2]	AUM	-132	-132	-132
Investment[3]	AUM	0 to $266	0 to $266	$524
Big game hunting[4]	RVD	0 to $13	0 to $13	$13
Upland game hunting[4]	RVD	0 to $13	0 to $13	$13
Nongame wildlife[4]	RVD	0 to $15	0 to $15	$15
Oil & gas leases	Acres	-17,315	-17,315	0
INCOME FROM PROPOSED INVESTMENTS[5]				
Grazing	$	0 to $4,602	0 to $4,602	$9,065
Big game hunting	$	0 to $142	0 to $142	$142
Upland game hunting	$	0 to $218	0 to $218	$218
Nongame wildlife	$	Unknown	Unknown	Unknown
Construction activity[6]	$	0 to $4,909	0 to $9,909	$9,176
Total[7]	$	0 to $4,962	0 to $4,962	$9,425
INCOME FROM OTHER EXPECTED OUTPUT CHANGES				
Grazing:				
Adjustments	$	-2,284	-2,284	-2,284
Oil and gas leases	$	-5,214	-5,214	0
Total[7]	$	-7,498	-7,498	-2,284
INCOME FROM ALL OUTPUT CHANGES				
All categories[7] [8]	$	-7,498 to -2,536 (-5,214 to -2,536)	-7,498 to -2,536 (-5,214 to -2,536)	$7,141 ($7,141)

[1] Represents effects for this WSA only. See table 7a for combined effects of enhanced wilderness alternative.

[2] Adjustments for possible reduction in livestock grazing without proposed pipeline. Possible reduction is based on inconclusive data and may not be necessary.

[3] Expected future increases due to range improvement investments.

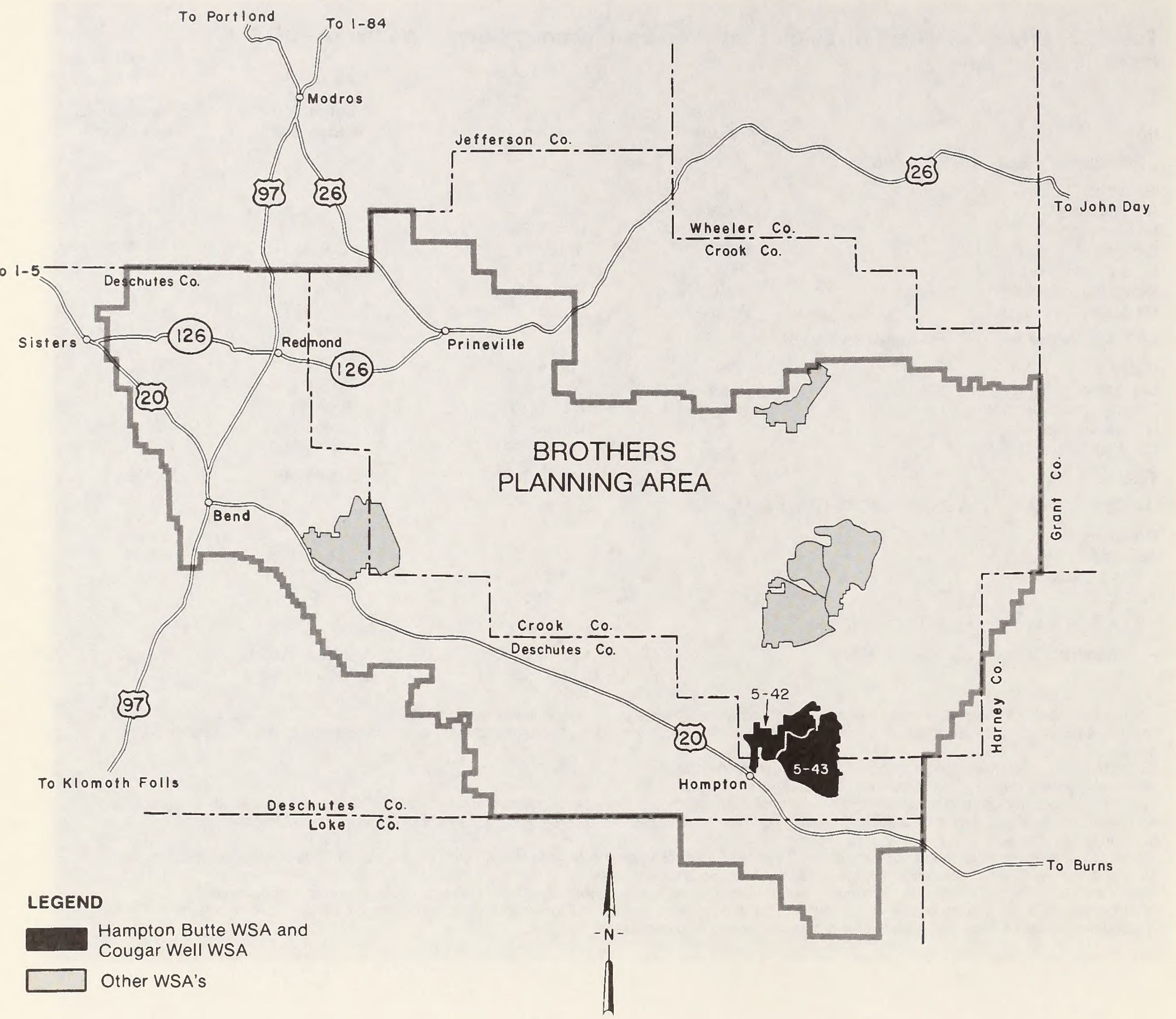
[4] Expected future increases from proposed structural wildlife projects.

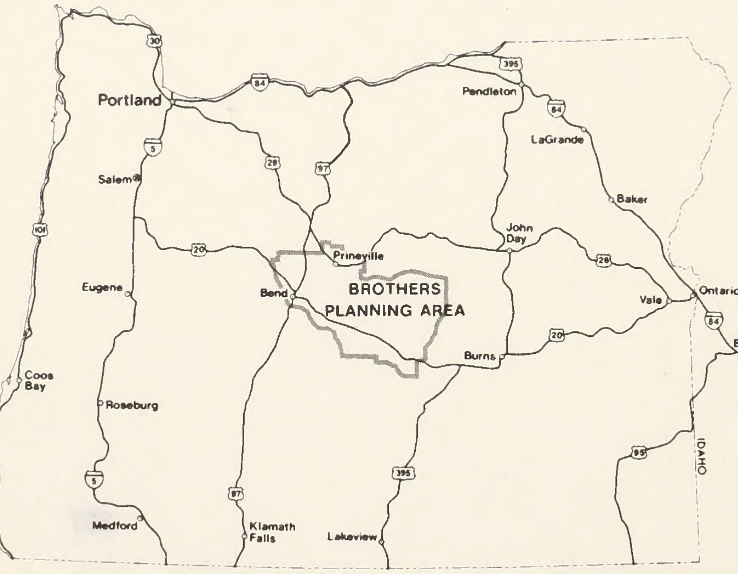
[5] Vegetative manipulation projects involving $77,947 total expenditures, and structural projects involving $121,338. Amounts shown in table represent combined results of both types of projects, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

[6] Local personal income generated annually during assumed 5-year construction period. This amount cannot be added to the income resulting from grazing and hunting activity because it is not sustained over the analysis period.

[7] Detail may not sum to "Total" due to rounding. Total omits income from construction which is limited to 5-year period. See footnote 6.

[8] See footnote 2. If the grazing adjustment is found to be unnecessary, compensating improvements would not be developed. Investments and grazing adjustments would be zero. The effects of this case are shown in parentheses.





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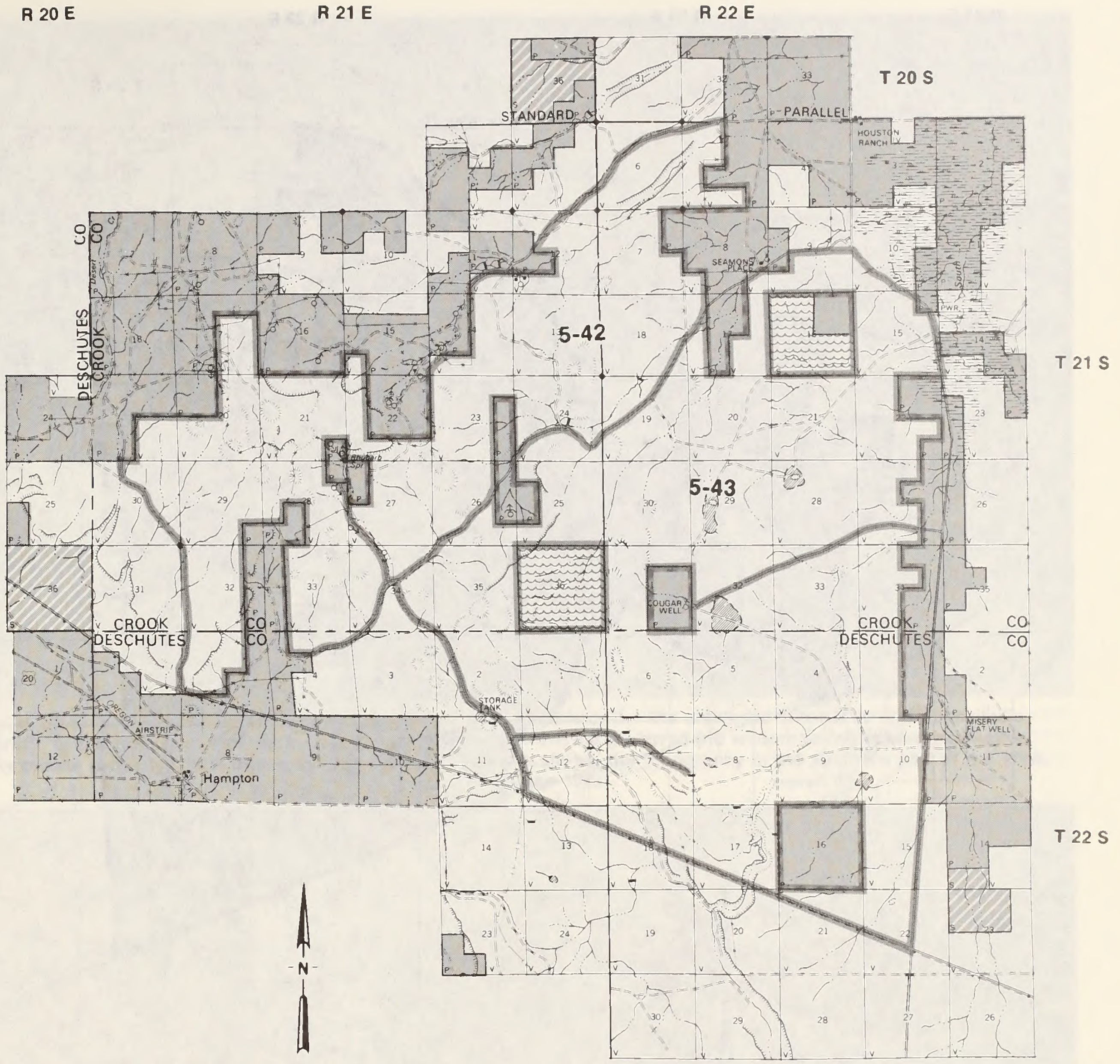
Prineville District
Hampton Butte WSA
OR-5-42 and
Cougar Well WSA
OR-5-43

LOCATION MAP

MAP 1



LEGEND

- Wilderness Study Area Boundary
- Boundary of Adjacent Wilderness Study Areas
- ☐ Bureau of Land Management
- ▨ State
- ■ Private
- ≋ BLM Surface-State or Private Subsurface (Split Estate)

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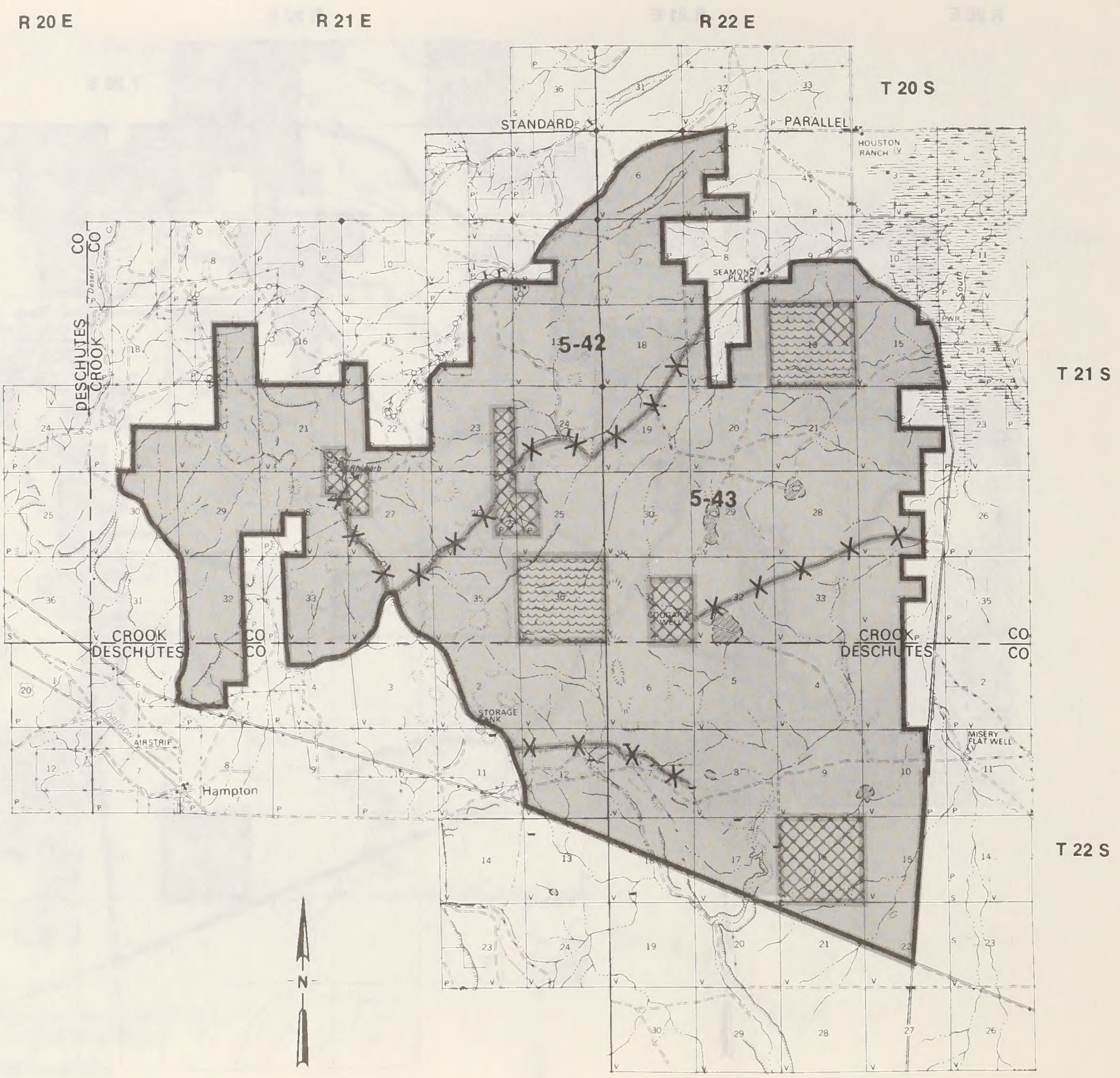
LAND OWNERSHIP

1 0 1 2 MILES



LEGEND

- Wilderness Study Area Boundary
- Boundary of Adjacent Wilderness Study Areas
- ▨ Recommended Suitable for Wilderness
- ▩ Non-Federal Land within Recommended Wilderness
- ▤ Non-Federal Minerals (Split Estate) within Area Recommended for Wilderness
- ╳ Recommended Road Closure

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Hampton Butte WSA
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ENHANCED ALTERNATIVE

1 0 1 2 MILES

MAP 3

Hampton Butte WSA, OR-5-42. Looking north into the southern portion of the WSA (some of the land in the foreground is private property). Within area recommended suitable under the enhanced alternative and nonsuitable under the preferred (no wilderness/no action) alternative. Illustrates the topography in the southern part of the WSA. June 1979.

Hampton Butte WSA, OR-5-42. Looking north at a typical vehicle way along the WSA's southern boundary. Within area recommended suitable under the enhanced alternative and nonsuitable under the preferred (no wilderness/no action) alternative. Typical example of juniper tree clusters in the WSA. June 1979.

Cougar Well WSA, OR-5-43. Looking northeast toward the western half of the WSA. Within area recommended suitable under the enhanced alternative and nonsuitable under the preferred (no wilderness/no action) alternative. Illustrates typical topography and scenery in the western half of the WSA.

Cougar Well WSA, OR-5-43. Looking east into the eastern edge of the WSA (the background is not within the WSA). Within the area recommended suitable under the enhanced alternative, and within the area recommended nonsuitable under the preferred (no wilderness/no action) alternative. Typical view of the high desert from this part of the WSA. June 1979.

Appendix to the Wilderness Environmental Impact Statement for Oregon

Soda Mountain Wilderness Study Area (OR-11-17)

General Description of Study Area

The Soda Mountain wilderness study area (WSA) is located 18 miles southeast of Ashland, Oregon, in Jackson County (see map 1). Medford, Oregon, the county seat, is approximately 30 miles northwest of the study area. Oregon State Highway 66 is approximately 4 miles north of the WSA boundary, and Interstate 5 lies approximately 6 miles west of the area.

Having a very irregular shape, the WSA contains 5,410 acres, all of it public land (see map 2). The area is bounded on the south by a road, on the northwest by the Pacific Crest National Scenic Trail, and by a powerline on the east. The northern boundary is on the flanks of Soda Mountain, and the west boundary is along Lone Pine Ridge. Adjacent lands are a mixture of private and public lands.

The study area lies on the steep, south-facing slopes of the Soda Mountain area. It is comprised of ridges and peaks ranging in elevation from 2,800 to 5,700 feet. Camp Creek, Dutch Oven Creek, and Salt Creek bisect the WSA. Vegetation is varied, with stands of mixed conifers and hardwoods, extensive dense brushfields, and some open grassy slopes.

Interrelationships

There are no noteable interrelationships between this WSA and other WSAs, other special land use designations, or programs administered by other agencies.

Issues

Issues relating to each WSA were raised by BLM and the public during the wilderness inventory and EIS planning and scoping process. These issues concern both the effects of wilderness designation on existing and potential land uses or resources in the WSA, as well as the effects of existing and potential land uses or resources on wilderness values. Land uses or resources raised as issues specifically for this WSA include:

- ecological diversity, wildlife habitat, grazing, mineral resources, recreation opportunities, watershed values, and vegetative species and composition in the WSA;
- potential timber production;
- potential energy and mineral development, including development of existing oil and gas leases;

- proposed wildlife habitat and livestock improvement projects; and,

- existing livestock grazing in the study area.

Other issues raised concerned the area's suitability as wilderness, considering its size, shape, terrain, and opportunities for solitude and primitive recreation; and how wilderness designation would affect management of adjacent private lands. (No significant effect of designation on management of adjacent private lands was identified, so this issue is not addressed further in this appendix.)

Description of the Alternatives

The following alternatives are analyzed:

- all wilderness
- no wilderness/no action (preferred alternative)

A partial alternative is not analyzed because, due to the area's size, there is no opportunity to recommend part of the area suitable as wilderness to avoid resource conflicts. During the public scoping process, an alternative labeled 'no wilderness/action' was suggested for Soda Mountain. Such an alternative is essentially the same as the no wilderness/no action alternative. Under that alternative, the BLM would actively manage the area in accordance with the existing land use plan under the principles of multiple use and sustained yield.

An enhanced wilderness alternative which would improve manageability of the Soda Mountain area by acquiring a 60-acre parcel of land protruding into the north boundary of the WSA was identified during the public scoping period, but is not analyzed. This parcel shows signs of human disturbance and is not suitable for wilderness designation.

All Wilderness

Under the all wilderness alternative, all 5,410 acres of the WSA would be recommended suitable for wilderness (see map 2). It would include an essentially natural area with a variety of vegetation communities and wildlife species.

No Wilderness/No Action (Preferred Alternative)

The no wilderness/no action alternative would recommend the entire WSA nonsuitable as wilderness. It represents the situation most likely to occur without wilderness designation. The area would be managed according to the current land use plan, which includes the following features relevant to this analysis:

- timber harvest on 340 public domain acres of high intensity forest management land (commercial forest land which is part of the timber base for allowable cut calculation). (Conventional logging techniques would require some 3 miles of road construction and improvement.);

- implementation of several vegetative manipulation (prescribed burning) projects to improve wildlife habitat; and

- continued availability for mineral exploration and development. (Drilling for oil and gas would be permissible on the oil and gas leases which extend over all of the area.)

Table 1 summarizes the proposed management of the WSA under each alternative.
Table 2 summarizes the environmental consequences of each alternative.

Table 1. Summary of Proposed Management Under Each Alternative, Soda Mountain WSA (OR-11-17)

Proposed Management	All Wilderness	No Wilderness/No Action
Acres Designated as Wilderness	5,410	0
Acres Closed to ORVs by Wilderness Designation[1]	5,410	0
Miles of Roads Constructed	0	3
Miles of Ways Closed	2	0
Acres Withdrawn from Mineral Location and Leasing by Wilderness Designation	5,410	0
Vegetative Manipulation for Wildlife:		
Brush Control Without Seeding (acres)	[1]	[1]
Structural Livestock Projects Developed:		
Fences (miles)	0-1	1
Acres of Timber Available for Harvest	0	340
Average Annual Volume of Timber Sold (Mbf-Thousand Board Feet)	0	155

[1] Prescribed burns are planned for the area to improve wildlife habitat, however the locations and acreages within the WSA have not been determined.

Table 2. Summary of Environmental Consequences of Alternatives, Soda Mountain WSA (OR-11-17)

Resource or Activity	Wilderness	No Wilderness/No Action (Preferred Alternative)
Wilderness Values	Would add 5,410 acres to NWPS. Preserve ridges and drainages on steep, south-facing slopes of Soda Mountain. Elimination of vehicle use on way would increase naturalness of area. Area would be manageable as wilderness.	As a result of timber management activities, naturalness and opportunities for solitude and primitive recreation would be reduced and special wilderness features would be impaired. Exploration for and development of energy and mineral resources could adversely affect wilderness values.
Energy and Mineral Development	Development precluded on 5,410 acres, including 5,410 acres with moderate potential for oil and gas, 2,160 acres with moderate potential for lead and molybdenum, and 1,040 acres with moderate potential for copper, gold, mercury and silver.	No impact.
Soils	No impact.	Some soil productivity loss due to timber harvest.
Water Quality	No impact.	Minor adverse impact to quality and seasonal flow of local streams.
Vegetation	Vegetation preserved.	Timber harvest would alter plant community structure, diversity and longevity. Species of special interest would be protected.
Wildlife	Wildlife habitat preserved. Options to improve habitat conditions on deer winter range might be slightly limited. No significant change in populations.	Increased wildlife disturbance due to improved access. Habitat reductions due to timber harvest. No significant change in populations, except a decrease in mountain lion populations.
Livestock Grazing	Opportunity to reduce annual livestock herding cost by $513 could be foregone.	Livestock herding costs would be reduced by $513 annually through fence construction.
Wood Products Harvest	Average annual harvest of 155 Mbf foregone.	Average annual harvest of 155 Mbf realized.
Recreation Use	Visitor use associated with ORVs would cease. Slight increase in primitive recreation use. No net change in recreation use.	ORV use would increase due to improved access. Primitive recreation use would decrease. Net increase in overall recreation use.
Economic Value and Local Income	Increase of $49,973 to $50,323 in annual economic value, and increase of $31,069 in local personal income.	Increase in annual economic value and local personal income of $106,860 and $61,604, respectively.

Manageability of the Area as Wilderness

The area would be manageable as wilderness under the all wilderness alternative. However, at times, it would be difficult to preserve wilderness values at the margins of the area because of timber management activities on adjacent lands.

Rationale for Selection of the Preferred Alternative

The no wilderness/no action alternative is preferred because the benefits of developing the area's resources and leaving it open for exploration and development of mineral resources would outweigh the benefits of preserving the area's wilderness values. The area's relatively small size and limited travel corridors would limit opportunities for visitors to find a secluded spot. Timber management activities outside the area would make it difficult to preserve wilderness values at times at the edges of the area. The preferred alternative would allow the harvest of 155,000 board feet of timber and exploration for and development of potential energy and mineral resources.

Affected Environment

This section discusses only those activities or resources that influence the character of the study area, or that may be affected by the alternatives.

Wilderness Values

Naturalness

The Soda Mountain WSA generally has a natural appearance. The steep terrain, dense brushfields, limited stands of commercial timber, and difficult access of the WSA have all contributed to keeping the area in an essentially natural state.

Man-made features within the WSA include two miles of drift fence near the eastern boundary, a well-used campsite on Camp Creek, and two miles of way (a vehicle route established and maintained solely by the passage of vehicles). The way extends from the the powerline on the eastern boundary through the southeast portion of the WSA to the Schohiem road.

The drift fence is only visible from a small area within the study area. The campsite on Camp Creek is concealed by surrounding trees and, therefore, is visible only from within the camp area itself. The way does not create an impact on a majority of the area, and vehicle use could easily be discouraged. The way would revegetate in a relatively short time.

These man-made developments can be seen from only a very small percentage of the WSA.

Signs of man outside the area but visible from within the WSA include lights in the communities of Yreka and Weed, California, and farming activities in nearby valleys to the south. These sights are visible from a few portions of the WSA and, as perceived by the average visitor, would not detract from the wilderness experience. Since most visitor use would occur in the creek drainages, the outside developments would not be visible in most cases.

Opportunities for Solitude or Primitive and Unconfined Types of Recreation

The WSA has some outstanding opportunities for solitude. The steep terrain, the three drainages, and dense vegetation provide topographic screening. On the other hand, the steep terrain would tend to funnel visitors into the drainages, reducing opportunities to find seclusion from other visitors. The relatively small size of the area would also limit opportunities to find a secluded spot.

The study area provides outstanding opportunities for hiking, camping, horseback riding, hunting and fishing. The Pacific Crest National Scenic Trail borders the northwestern portion of the WSA. There is botanical diversity and opportunities for observing birds and other animals. Water is abundant and scenic vistas are numerous. The drainages for the three streams are interesting and challenging for short backpacking trips. The variety of species present and the topography of the area contribute to the quality of these opportunities.

Special Features

The south slopes of the WSA are deer winter range, with the southeastern portion designated as crucial deer winter range. Wilderness-associated species in the area include black bear, mountain lion, bobcat, and golden eagle.

There is great ecological diversity in the area and it is suspected, though not verified, that the WSA contains two plant species of special interest: *Calochortus greenei* and *Cirsium ciliolatum*. (These plants are discussed further in the Vegetation section.)

Diversity in the National Wilderness Preservation System (NWPS)

According to the Bailey-Küchler system of classifying ecosystems, the Soda Mountain WSA is located in the Pacific Forest and Sierran Forest Provinces, and the potential natural vegetation is cedar-hemlock-Douglas fir forest and mixed conifer forest.

Of the ecosystems listed in the Siskiyou Mountains section of the Oregon Natural Heritage Plan, the WSA contains the ponderosa pine-Douglas fir forest in the eastern Siskiyous ecosystem.

There are three standard metropolitan statistical areas with population over 100,000 within 5 hours' driving time of the area: Eugene/Springfield, and Medford, Oregon; and Redding, California.

Energy and Mineral Development

Energy and mineral resources were evaluated from available geologic data combined with results from a BLM geochemical stream-sediment survey. Technical details of the evaluation are in a BLM report titled 'Assessment of Geology, Energy and Mineral Resources of the Klamath-Butte Falls Geologic Resource Area.

The WSA is within the Klamath-Butte Falls geologic resource area which has been classified according to a rating system that indicates both the potential for occurrence (geologic favorability) of certain minerals, as well as the quantity and quality of data on which the rating is based (confidence level). A description of the rating system is provided in the Statewide EIS volume.

The entire WSA is considered moderately favorable for the accumulation of oil and gas, based on lithologies of underlying Cretaceous and early Tertiary sedimentary rocks. As of January 1, 1984, the entire WSA was leased for oil and gas. There have been no exploration operations, and there are no surface manifestations to indicate either geothermal, oil and gas or coal resources.

Analysis of geochemical sampling, combined with interpretation of the geology within the WSA, indicates a moderately favorable environment for the occurrence of metals in parts of the WSA, including lead, molybdenum, copper, gold, silver, and mercury. Silver, copper, mercury and molybdenum are strategic and critical minerals; however, there are no known deposits of strategic and critical minerals in the WSA.

Details of the mineral potential classifications are shown in table 3. Map 3 shows the portions of the WSA rated moderate (medium) for metals.

There are no known mineral deposits, active exploration projects or mining claims within the WSA as of January 1, 1984; however, there are several known mineral deposits and rock aggregate sources within six miles of the WSA. Potential for aggregate sources is moderately favorable in the entire WSA. Also, as of January 1, 1984, there were no geothermal leases in the WSA.

Exposed rocks in the area are composed of non-marine volcanics of the Western Cascade Range. These mid-Tertiary basaltic andesite flows are interbedded with breccias and pyroclastics. Underlying rocks (based on regional geologic mapping) range from andesitic flows, pyroclastic and volcaniclastic early Tertiary sediments to early Tertiary to Cretaceous non-volcanic, non-marine sediments. These rocks have subsequently been faulted, and intruded, locally, by intermediate to basic dike swarms and sills.

Soils

The soils in the WSA and their characteristics which could be affected are portrayed in table 4.

Table 3. Classification of Energy and Mineral Potential, Soda Mountain WSA (OR-11-17)

Commodity	Area	Classification Level	Confidence Level
Metals			
lead, molybdenum	See map 3	3	B
	Rest of area	2	A
copper, gold	See map 3	3	B
mercury, silver	Rest of area	2	A
Uranium/Thorium	Entire WSA	2	B
Bentonite, zeolite diatomite, limestone	Entire WSA	1	A
Oil/Gas	Entire WSA	3	A
Coal	Entire WSA	2	B
Tar Sands/Oil Shale	Entire WSA	2	B
Geothermal	Entire WSA	2	A
Sodium/Potassium	Entire WSA	1	A
Mineral Materials (aggregate)	Entire WSA	3	C

Legend
Class 1 - Lack of indications of favorability
Class 2 - Low favorability
Class 3 - Moderate favorability
Class 4 - High favorability

Confidence Level A - Insufficient data or no direct evidence
Confidence Level B - Indirect evidence available
Confidence Level C - Direct evidence but quantitatively minimal
Confidence Level D - Abundant direct and indirect evidence.

Water Quality

The WSA lies within the Klamath Basin. Dutch Oven, Camp and Salt Creeks (the last an intermittent stream) flow through the area. Streamflows in the area are quite variable. Highest stream flows occur during winter and spring months from rainstorms augmented by snow melt. Low flows occur in the late summer and fall. Water quality within the WSA is generally good.

Vegetation

Vegetation is varied with stands of mixed conifers and hardwoods, extensive dense brushfields, and some open grassy slopes. There are three basic vegetative communities within the area: oak-pine-fescue and shrubby scabland comprising 50 to 60 percent of the WSA and found generally on shallow, rocky soils in the southeast and northwest portions of the area; steep mountain grassland and mahogany-oak-fescue communities dominating about 20 to 30 percent of the WSA, near Lone Pine Ridge; and white fir-mixed fir forest community making up 5 to 10 percent of the WSA near Soda Mountain and extending into major creek drainages.

Table 4. Soil Characteristics of the Soda Mountain WSA (OR-11-17)

	Depth	Slope Erodability	Stability	Compaction Hazard	Other
Hobit loam (845)	20-40"	Low.	High to moderate.	Very low BD increases loss of water holding capacity, etc.; low clay increases chance to ameliorate compaction by rippling.	Relatively high OM in surface. Surface compaction hazard and assoc. disturbance could cause loss of OM or nutrients.
Farva cobbly loam (809)	20-40"	Low, though often assoc. with less stable parent materials.	High to moderate.	Moderate.	Low in surface organic matter, very rocky.
McNull gravelly loam (708)	40$"	Moderate - prone to rill or gully erosion if rutted.	May be unstable and slump prone if parent material is pyroclastic.	Moderate to high. Clay makes compaction difficult to ameliorate by ripping.	Least stable in WSA; roads and timber harvest could destabilize soils.
Woodseye stony loam (806)	10-20"	Moderate; shallow depth makes any soil loss less tolerable.	Stable.	Moderate.	----
McMullin-Rock out-crop (711)	10-20"	Same as Woodseye.	Stable.	Moderate.	----
Heppsie clay (709)	20-40"	Moderate to high; rutting by vehicles may cause gully erosion.	Moderate to low.	Moderate to high. Clay makes compaction difficult to ameliorate.	Roads could destabilize slopes.
Skookum very cobbly clay loam (705)	20-40"	Similar to Heppsie; slow infiltration rates increase erosion hazard.	Moderate.	Similar to Heppsie; clay, rocks and steep slopes make amelioration of compaction by ripping difficult.	Very rocky throughout profile.

Key to Abbreviations:
OM = Organic Matter
BD = Bulk Density

Based on habitat requirements, it is suspected that two plant species of special interest (mentioned in the Special Features section) could be found in the WSA: *Calochortus greenei* (Greene's mariposa) and *Cirsium ciliolatum* (Ashland thistle). These two species are candidates for federal listing as threatened or endangered.

Wildlife

The wilderness study area contains good, healthy populations of black-tailed deer, bear, and coyotes. There is also a small herd of elk west of the wilderness study area that is expected to expand into the area in the near future. Portions of the area contain abundant quail. These animals are all hunted in the WSA.

The area also contains mountain lions and bobcats. There is evidence of a pair of golden eagles in the study area. Their nest location is not known, but it is believed that they nest within the study area boundary due to repeated sightings of young and adults in the area.

A large portion of the area is crucial winter range for big game, especially at lower elevations and southwest exposures. Harrassment of big game due to off-road-vehicle use is a slight problem in the area, particularly for mountain lion.

Camp Creek and Dutch Oven Creek contain viable rainbow trout populations. These populations currently receive light pressure from anglers.

To improve wildlife habitat within the area, several burning projects are planned. Due to the terrain and ecosystem, fire is considered the primary wildlife habitat management technique in the area. Prescribed burning was conducted in 1982 within the WSA. Such burning is beneficial to wildlife because it creates a natural mosaic of openings in the brush. The 1982 prescribed burn reintroduced fire to maintain the natural condition of a fire-dependent ecosystem.

Livestock Grazing

The Soda Mountain wilderness study area is within the Soda Mountain grazing allotment. The current season of grazing use is June 1 to July 15. Livestock use in the WSA totals 517 AUMs (animal unit months, the amount of forage needed to sustain one cow and a calf, or equivalent animals, for one month) in even-numbered years and 117 (AUMs) in odd-numbered years; this is an average annual use of 317 AUMs.

Construction of one mile of fence is planned to complete the existing drift fence, the only existing livestock project in the WSA (mentioned in Naturalness section). No livestock forage increases are expected in the area. Operators seldom use motorized vehicles in this area because of the steep terrain. Horses are used for all management activities.

Wood Products Harvest

The wilderness study area includes 340 public domain acres of commercial forest management lands classified for high intensity management. This acreage contains approximately 13 million board feet of standing timber volume, and would provide an average annual harvest of about 155 Mbf (thousand board feet) per year or about .13 percent of the annual allowable cut for the Jackson-Klamath sustained yield units.

The timber would be readily marketable as it is located only 30 road miles from Medford lumber mills.

Recreation Use

Recreational uses of the study area include hunting, fishing, camping, horseback riding, rockhounding, off-road-vehicle (ORV) activities, wildlife observation, and hiking.

The major use appears to come from hunters, with hiking, camping, horseback riding, and some ORV use in conjunction with hunting or rockhounding. ORV use has been occurring predominantly in the southeastern portions of the WSA.

Economic Value and Local Income

Livestock grazing, timber production, oil and gas leases, and recreation are resource outputs which generate economic activity in the WSA. As of January 1, 1984, there were no geothermal leases on the WSA.

Economic value and local personal income generated from existing levels of resource outputs of these lands are presented in table 5. The terms economic value and local personal income are discussed in the Statewide EIS volume.

Environmental Consequences

This section discusses the environmental consequences of implementing each of the alternatives. Resources and activities not significantly affected by any of the alternatives are not discussed. General impact conclusions applicable to all WSAs, including impact conclusions based on speculative future developments (developments which are possible, but are not currently proposed), are discussed in the Statewide EIS volume. That volume also discusses certain assumptions that were made for this analysis.

Effects on Wilderness Values

Under the **all wilderness alternative**, all 5,410 acres in the WSA would be added to the National Wilderness Preservation System (NWPS). Wilderness designation would preserve the forest, grass- and brush-covered ridges and drainages in their present condition. Elimination of vehicle use on the way would allow the route to revegetate,

Table 5. Economic Value and Local Personal Income Generated Annually, Existing Program, Soda Mountain WSA (OR-11-17) (1981 price levels)

Resource Output	Unit of Measure	Quantity	Economic Value	Local Personal Income Generated
Grazing[1]	AUM	317	$2,390	$6,242
Recreation (incl. hunting)	RVD	Unknown	Unknown	Unknown
Timber	MBF	155	15,615	6,632
Oil & gas leases	Acres	5,410	5,410	1,629
Total existing			23,415	14,503

[1] Quantity shown is average of 117 and 517 AUMs, respectively, in alternate years.

and the area in the vicinity of the way would be restored to a more natural condition.

Under the **no wilderness/no action alternative**, timber would be harvested on 340 acres and approximately 3 miles of road would be built on the edge of the area to harvest the timber. The timber cutting, road construction and other timber management activities would reduce the naturalness of about 6 percent of the area. Harvest and other management activities and travel on the timber haul roads by recreationists would reduce opportunities for solitude and primitive recreation. Exploration for and development of oil and gas, metals and other minerals could adversely affect wilderness values in any part of the area.

Energy and Mineral Development

The **all wilderness alternative** would withdraw from mineral exploration and development 5,410 acres, including the areas with moderate potential for oil and gas and rock aggregate sources, which encompass the entire WSA. It would also include 2,160 acres with moderate potential for lead and molybdenum, and 1,040 acres with moderate potential for copper, gold, mercury, and silver.

No acreage would be withdrawn under the **no wilderness/no action alternative**.

Effects on Soils

No impacts to soil would occur under the **all wilderness alternative**.

Under the **no wilderness/no action alternative**, there would be a loss in soil productivity directly proportional to amounts of road construction, yarding system utilized, and burning activities during site preparation. These are usually transitory effects, declining to pre-logging levels within five to ten years.

Effects on Water Quality

No impacts would occur to water quality or quantity under the **all wilderness alternative**.

Under the **no wilderness/no action alternative**, timber management activities would adversely affect seasonal streamflow characteristics (peaks and low flows) and instream water quality (sedimentation, temperature, dissolved oxygen, nutrients and organic substances) in Dutch Oven, Camp and Salt Creeks.

Adverse impacts would be minor because of the modest amount of commercial timber and the application of site-specific mitigating measures during harvest.

Effects on Vegetation

Areas designated wilderness would not be subject to most surface disturbing activities. Vegetation dependent upon the existing undeveloped environment would thus be maintained under the **all wilderness alternative**.

Also, under the all wilderness alternative, fire would be introduced to open brushfields and rejuvenate certain native species.

Under the **no wilderness/no action alternative**, timber harvest would occur on 340 acres of public domain lands currently classified as high intensity forest management lands. Continued timber management would not allow natural succession to replace the existing plant communities because future forests would be harvested before they reached climax.

The size and frequency of fires in the brushfields might be different under the no wilderness/no action alternative than under the all wilderness alternative. The reasons for this difference are explained in the following Wildlife section. Although the size and frequency of fires might vary, the total acreage of brushfields burned under each alternative probably would be about the same. Therefore, the proportions of the area in grass and brush under each alternative probably would be about the same.

The two federal candidate species of special interest which are suspected to occur in the WSA would receive the same protection as federally listed threatened or endangered species.

Effects on Wildlife

Under the **all wilderness alternative**, wildlife habitat would be preserved.

Wilderness designation could reduce options to improve conditions on the deer winter range. The range is currently in a downward trend due to the growth of dense brushfields that have developed since fires were controlled. Since the area is a fire-dependent ecosystem, fire can be used to rejuvenate the desired species. Under both alternatives, more of the area would burn than during the time when fires were aggressively controlled. As a result, less of the area would be covered by brush, and deer habitat would improve.

Under the all wilderness alternative, wildfire could be allowed to play its natural role in the ecosystem. Prescribed burning could be allowed on a case-by-case basis if it conformed with both an approved fire management plan and Wilderness Management Policy.

Under the **no wilderness/no action alternative**, prescribed burning to improve deer habitat would be allowed. The size and frequency of fires under the two alternatives might differ, but the total acreage burned probably would not be significantly different.

Under the no wilderness/no action alternative, the construction of roads would increase sedimentation in the trout streams, Dutch Oven and Camp Creeks. This increased sedimentation would last for several years even if the roads were blocked and seeded. Such sedimentation would decrease trout habitat, although significant decreases in trout populations are not expected.

Removal of the old growth timber which stands on all 340 acres of commercial forest land in the WSA would cause localized losses of populations of species requiring old growth for habitat. Although no spotted owls are known to inhabit this area, known nest sites are within 1 1/2 miles. The harvesting of this old growth timber could remove stands used as foraging habitat by the spotted owls inhabiting nearby nests and could also inhibit the dispersal of young spotted owls along the Siskiyou Mountain Crest.

The logging activities would reduce nesting habitat for the golden eagle. It may also reduce the thermal cover needed for big game on the winter range. But big game populations are expected to remain stable, as mitigation measures would maintain adequate thermal cover. The logging and the road construction would affect the habitat of the mountain lion by allowing improved access for vehicles and increased wildlife disturbance. Mountain lion populations would decline and possibly disappear from the area.

Effects on Livestock Grazing

Under the **all wilderness alternative**, the proposed one mile of fence might or might not be allowed, depending on a site-specific assessment of whether it conforms with Wilderness Management Policy. If not allowed, an opportunity to decrease livestock herding costs by $513 annually would be foregone.

Under the **no wilderness/no action alternative**, livestock herding costs would be reduced by $513 annually through construction of the proposed fence. The fence has a benefit/cost ratio greater than 1:1.

Effects on Wood Products Harvest

The **all wilderness alternative** would preclude harvest of the commercial timber within the study area. Harvest of an average of 155 Mbf/year would be foregone.

Under the **no wilderness/no action alternative**, timber would be harvested and would yield an average of 155 Mbf/year, about .13 percent of the annual allowable cut on BLM-administered lands in the Jackson-Klamath sustained yield units.

Effects on Recreation Use

Under the **all wilderness alternative**, a small increase in primitive recreation would be expected. Based on present low use levels and the opportunities available in the area, this increase would not be very great.

Since the use of motorized vehicles for recreation would be excluded in a wilderness area, those vehicle-oriented recreation activities would shift to other areas. In the past, most vehicle use appears to have been associated with hunting or rockhounding and, although these activities can be pursued without motor vehicles, some users would be unwilling or unable to do so. There would be no significant net change in overall recreation use within the WSA.

Under the **no wilderness/no action alternative**, primitive recreation would decline. Since the timber management program would involve building roads, and since vehicle-oriented hunting is a popular method of hunting in Oregon, the increase in recreational activities involving vehicles would be

Table 6. Effects of Alternatives on Annual Economic Value, Soda Mountain WSA (OR-11-17) (1981 price levels)

Item	Unit of Measure	All Wilderness	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS			
Big game hunting[1]	RVD	$3,224	$4,837
Timber	MBF	-155	0
Oil & gas leases	Acres	-5,410	0
Reduced grazing cost	$	0 to $513	$513
VALUE OF PROPOSED INVESTMENTS[2]			
Big game hunting	$	$73,194	$109,794
Reduced Grazing cost	$	0 to $513	$513
Total[3]	$	$73,194 to $73,707	$110,308
Investments[4]	$	-2,190 to -2,353	-3,448
Net economic value	$	$71,004 to $71,354	$106,860
VALUE OF OTHER EXPECTED CHANGES IN OUTPUTS			
Timber	MBF	-15,615	0
Oil and gas leases	$	-5,410	0
Reduced access[5]	$	-6	0
Total	$	-21,031	0
VALUE OF TOTAL EXPECTED CHANGES IN OUTPUTS			
All categories	$	$49,973 to $50,323	$106,860

[1] Potential increases from proposed vegetative manipulation projects.

[2] Vegetative manipulation projects involving up to $134,168 total expenditures, and structural projects involving up to $2,750. Amounts shown in the table represent combined results of both types of projects, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

[3] Detail may not sum to "Total" due to rounding.

[4] Average annual cost of investment expenditures amortized at 7.875% over 50-year period.

[5] Additional cost (shown as negative value) due to restriction of vehicular access for livestock operator.

Table 7. Effects of Alternatives on Local Personal Income, Soda Mountain WSA (OR-11-17) (1981 price levels)

Item	Unit of Measure	All Wilderness	No Wilderness/ No Action
CHANGES IN RESOURCE OUTPUTS			
Big game hunting[1]	RVD	$3,224	$4,837
Timber	MBF	-155	0
Oil & gas leases	Acres	-5,410	0
Reduced grazing cost	$	0 to $513	$513
INCOME FROM PROPOSED INVESTMENTS[2]			
Big game hunting	$	$39,330	$59,008
Reduced grazing cost	$	Unknown	$2,596
Construction activity[3]	$	$4,118 to $4,542	$6,601
Total[4]	$	$39,330	$61,604
INCOME FROM OTHER EXPECTED OUTPUT CHANGES			
Timber	MBF	-6,632	0
Oil and gas leases	$	-1,629	0
Total[4]	$	-8,261	0
INCOME FROM ALL OUTPUT CHANGES			
All categories[4]	$	$31,069	$61,604

[1] Potential increases from proposed vegetative manipulation projects.

[2] Vegetative manipulation projects involving up to $134,168 total expenditures, and structural projects involving up to $2,750. Amounts shown in the table represent combined results of both types of projects, including construction and maintenance plus any added annual cost for management of herds and monitoring the allotment.

[3] Local personal income generated annually during assumed 5-year construction period. This amount cannot be added to the income resulting from hunting activity because it is not sustained over the analysis period.

[4] Detail may not sum to "Total" due to rounding. Total omits income from construction which is limited to 5-year period. See footnote 3.

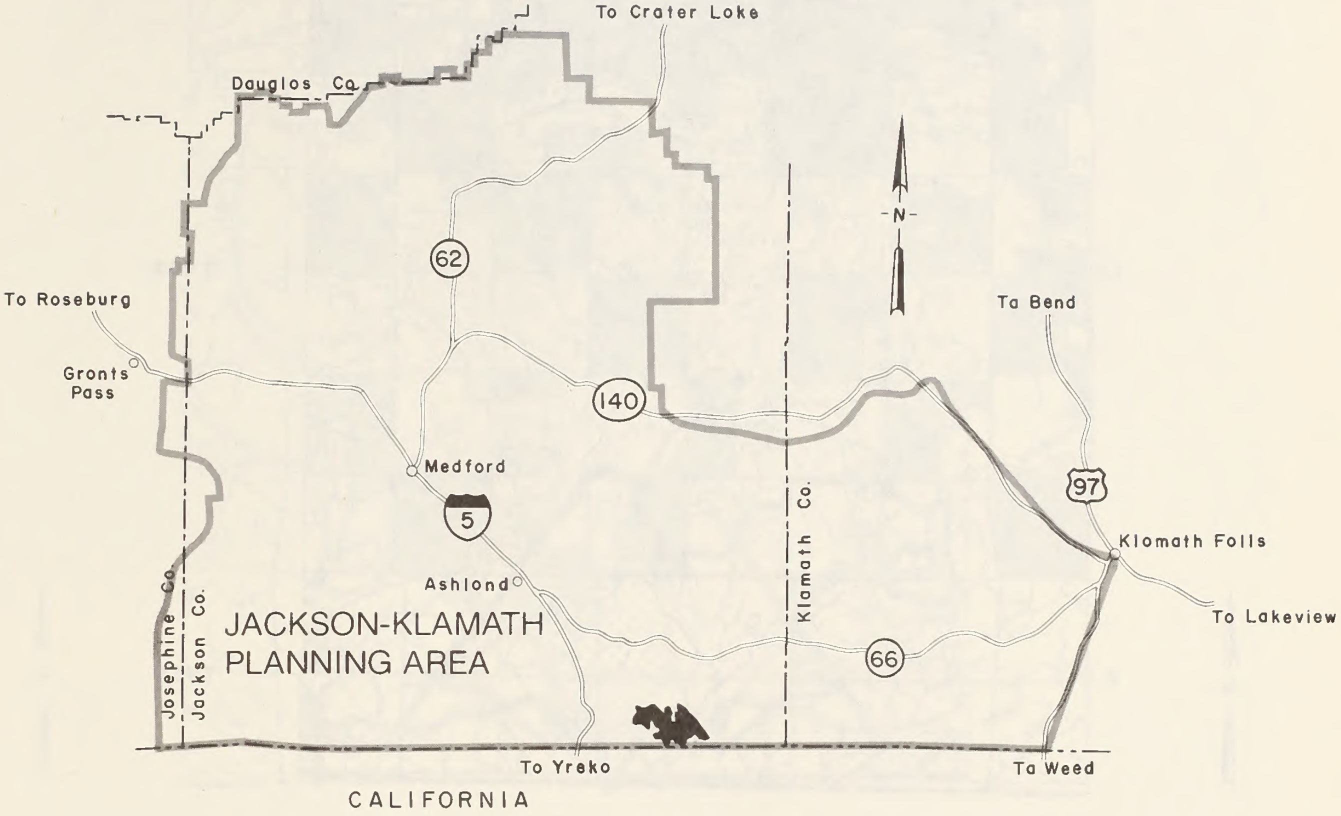
greater than the decrease in primitive recreational activities. There would be a slight net increase in overall recreation use.

Effects on Economic Value and Local Income

The economic effects for the alternatives are presented in tables 6 and 7. Table 6 shows the effects on economic value and table 7, the effects on local personal income. It is not known at this time whether the proposed fence would be constructed if the area were designated wilderness. It is known that some burning of vegetation would be allowed in order to maintain the natural ecosystems. Timber harvest would not be allowed under the all wilderness alternative.

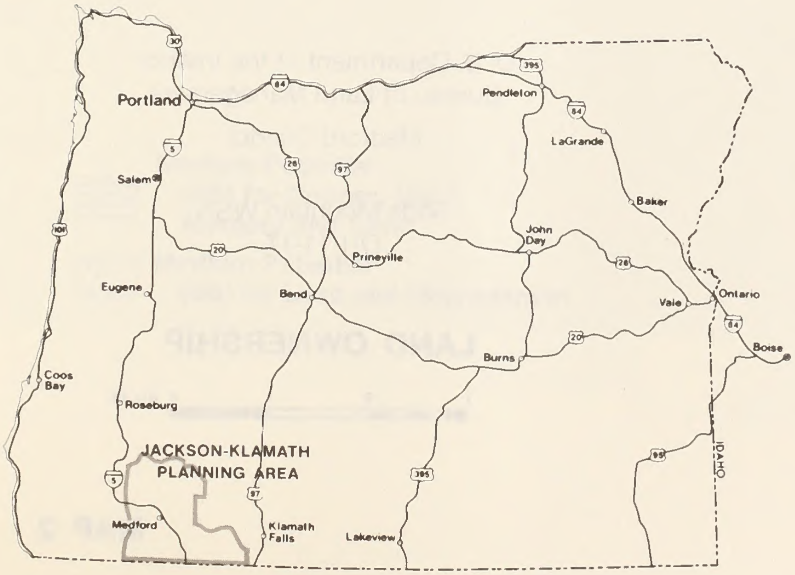
The column for the all wilderness alternative shows the effects as a range of values dependent upon whether the proposed fence were allowed.

Currently, there is little dependence on vehicles for livestock management in the study area, and road closures under wilderness designation would not significantly increase the costs of the grazing operator in the WSA.



LEGEND

■ Soda Mountain WSA



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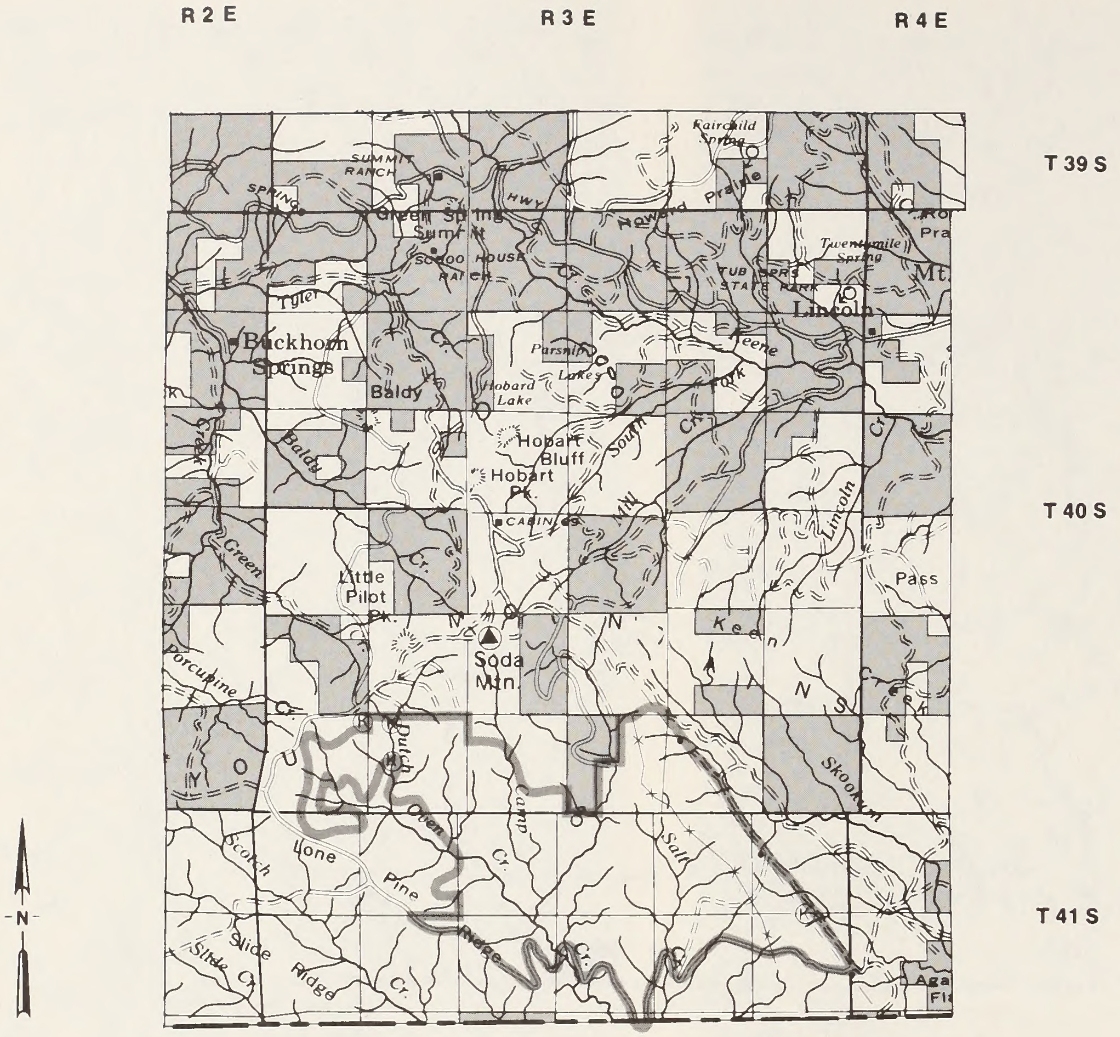
Bureau of Land Management
Medford District

Soda Mountain WSA
OR-11-17

LOCATION MAP

10 0 10 MILES

MAP 1



LEGEND

▬ Wilderness Study Area Boundary

☐ Bureau of Land Management

▨ Private

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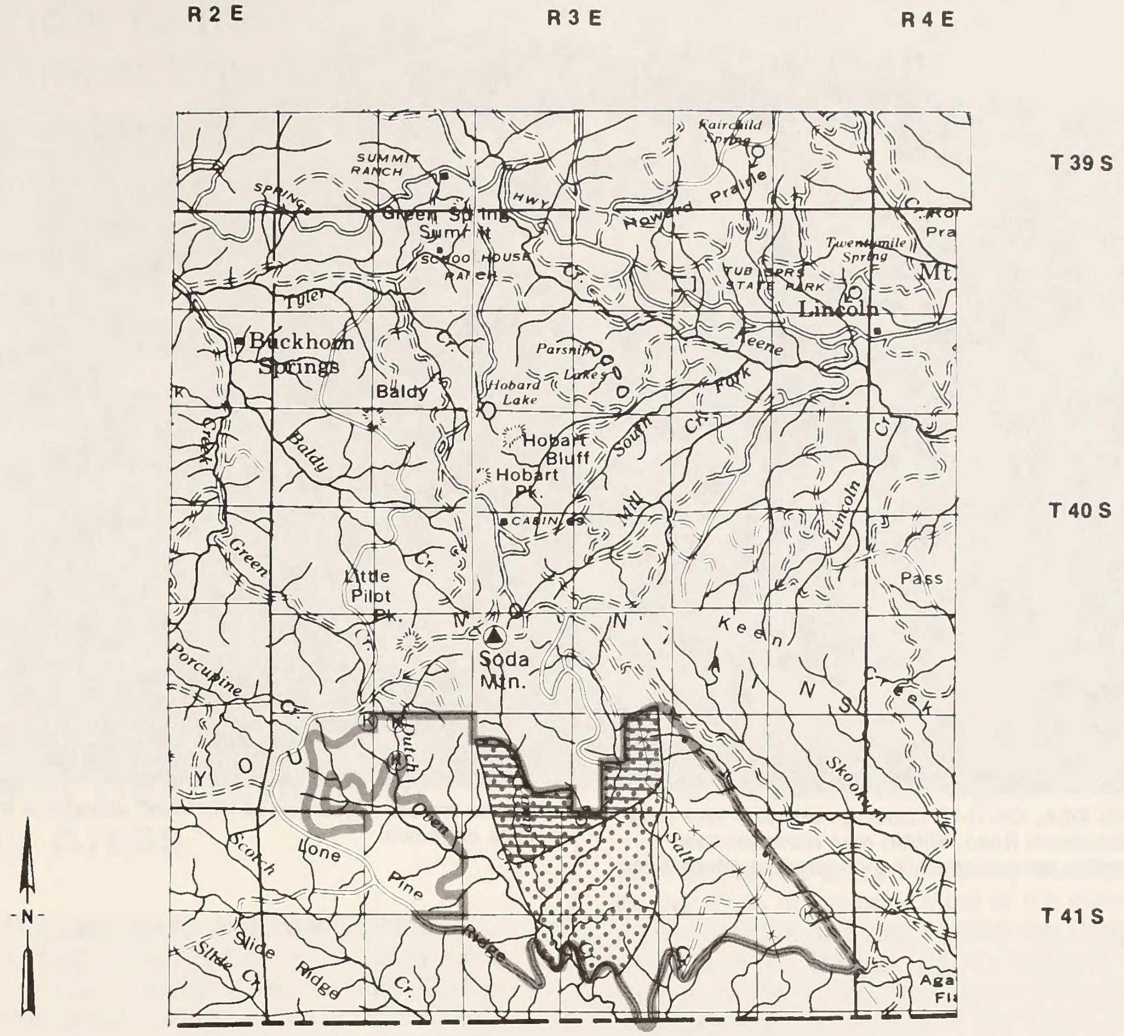
Soda Mountain WSA
OR-11-17

LAND OWNERSHIP

1 0 1 2 MILES

MAP 2



▤ **Medium Potential (3B) for Copper, Gold, Mercury and Silver**

░ **Medium Potential (3B) for Lead and Molybdenum**

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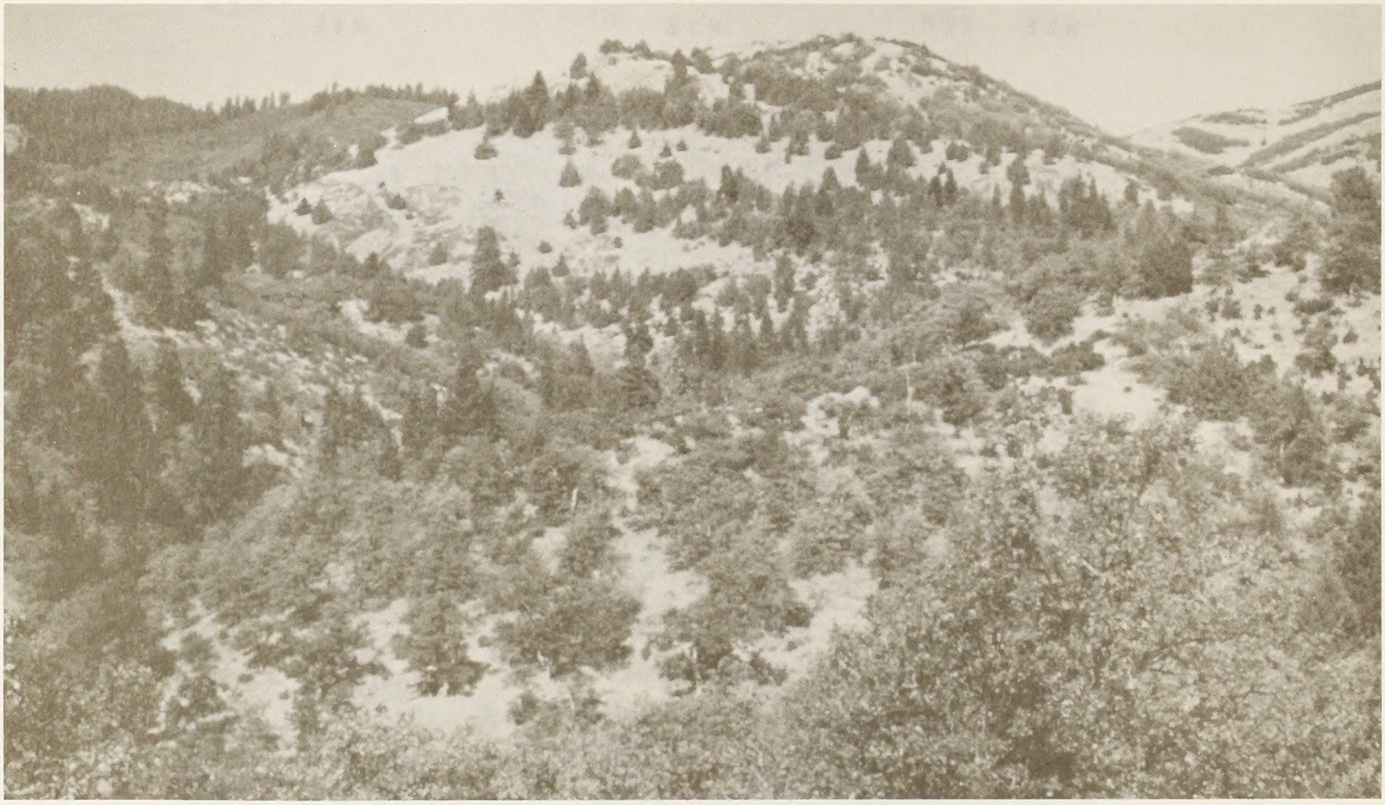
Soda Mountain WSA
OR-11-17

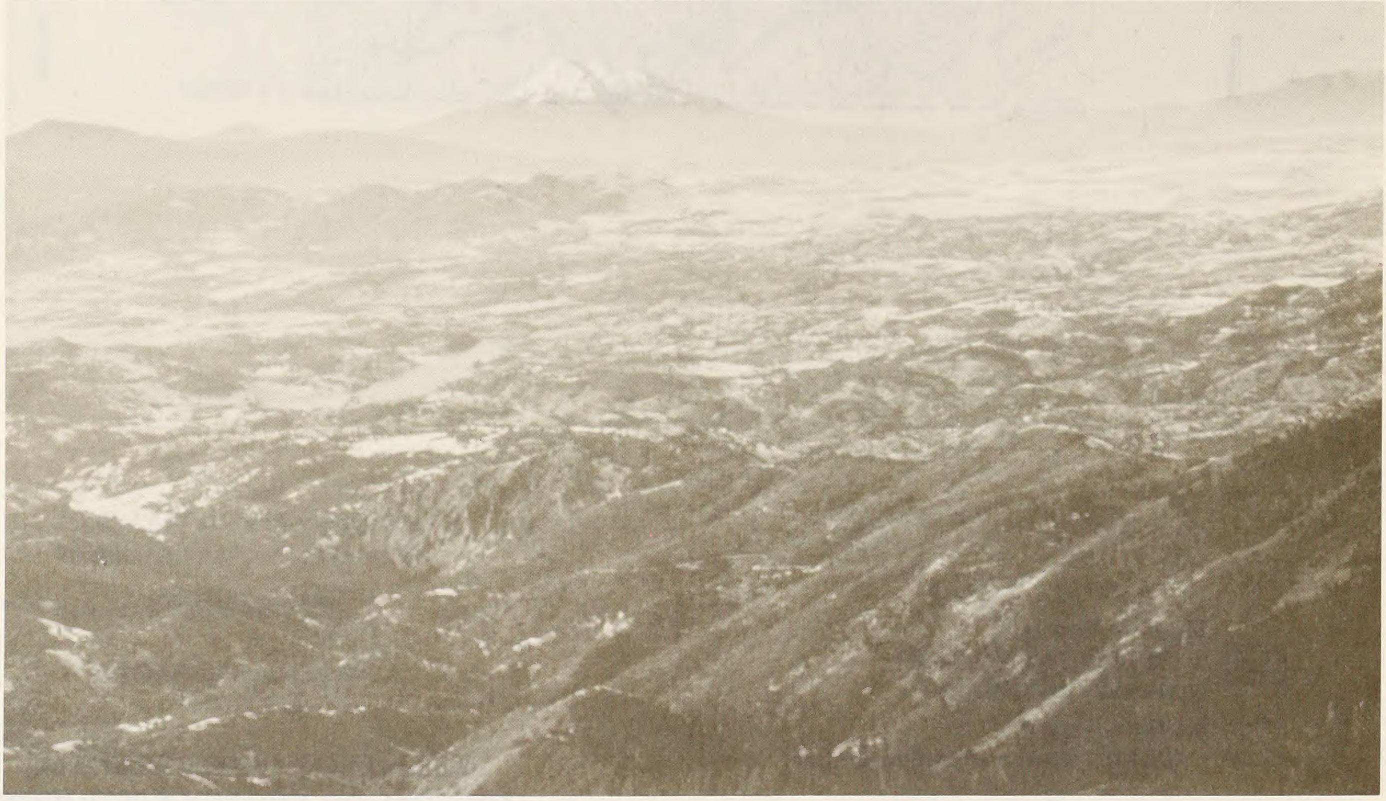
MEDIUM OR HIGH POTENTIAL MINERAL OR ENERGY RESOURCES

1 0 1 2 MILES

MAP 3



Soda Mountain WSA, OR-11-17. Looking northeast into WSA from above Schoheim Road. Within area recommended nonsuitable under the preferred (no wilderness) alternative. Shows typical vegetation of the lower elevations in the WSA. Date unknown.



Soda Mountain WSA, OR-11-17. Looking south from Soda Mountain toward Mount Shasta (WSA is in foreground on lower third of photo). Within area recommended nonsuitable under the preferred (no wilderness) alternative. Date unknown.

Appendix to the Wilderness Environmental Impact Statement for Oregon

North Sisters Rocks (OR-12-8) and Zwagg Island (OR-12-14) Wilderness Study Areas

General Description of Study Areas

The North Sisters Rocks and Zwagg Island wilderness study areas (WSAs) are located along the coast of Curry County, Oregon. North Sisters Rocks, three small rocks of about one acre each, are located midway between Port Orford and Gold Beach, while Zwagg Island, an island of five acres, is immediately west of Brookings (see maps 1 and 2).

North Sisters Rocks are surrounded by Pacific surf at high tide and attached on one side to an exposed sand and rock beach at low tide. One rock rises 134 feet and another 78 feet above sea level; the third is somewhat lower. All three rocks have steep, rocky cliffs on all sides and steeply rolling tops. The thin soil mantle atop each rock supports broadleaf coastal shrubs, mostly wind-sheared salal and twinberry and patches of grass.

Zwagg Island rises abruptly in near-vertical cliffs to a flat top 102 feet above sea level. During the winter months, when prevailing winds are from the southwest, Zwagg Island is surrounded by surf at high tide. A major portion of the top of Zwagg Island is covered with a thin soil mantle which supports coastal shrub vegetation including salal, wax myrtle, twinberry, and poison oak. There are also scattered Sitka spruce and grassy rock niches with herbaceous plants.

Interrelationships

Both of the WSAs are fronted by beaches managed by the State of Oregon. Most of the other offshore marine islands and rocks along the Oregon coast are part of the Oregon Islands National Wildlife Refuge or the Three Arch Rocks National Wildlife Refuge. All of the islands in the Three Arch Rocks Refuge and most of the islands in the Oregon Islands Refuge are designated wilderness. The U.S. Fish and Wildlife Service is studying islands and rocks totaling about 95 acres in the Oregon Islands Refuge for possible wilderness designation. BLM manages three wilderness islands in the vicinity of Sunset Bay.

Issues

Issues relating to each WSA were raised by BLM and the public during the wilderness inventory and EIS planning and scoping process. These issues concern both the effects of wilderness designation on existing and potential land uses or resources in the WSA, as well as the effects of existing and potential land uses or resources on wilderness values. One land use raised as an issue specifically for these WSAs is future use of the rocks and island for jetty material. Also raised as an issue was the manageability of the WSAs as wilderness considering their extremely small size.

Description of the Alternatives

The following alternatives are analyzed:

- all wilderness (preferred alternative)
- no wilderness/no action

Enhanced wilderness or partial alternatives are not analyzed for North Sisters Rocks or Zwagg Island. There are no reasonable means of enhancing the wilderness values of either WSA, and it would not be feasible to make a partial wilderness designation of such small areas.

All Wilderness (Preferred Alternative)

The entire areas of North Sisters Rocks and Zwagg Island WSAs would be recommended suitable as wilderness under the all wilderness alternative.

No Wilderness/No Action

The no wilderness/no action alternative would recommend the WSAs nonsuitable as wilderness. It represents the situation most likely to occur without wilderness designation. The areas would be managed according to the current land use plan and would continue to be available for rock quarrying, although this activity is unlikely to occur.

Table 1 summarizes the proposed management of the WSA under each alternative.

Table 2 summarizes the environmental consequences of each alternative.

Table 1. Summary of Proposed Management Under Each Alternative, North Sisters Rocks (OR-12-8) and Zwagg Island (OR-12-14) WSAs

	Proposed Management	No Wilderness/ No Action
Acres Designated as Wilderness	8	0
Acres Withdrawn from Mineral Location and Leasing by Wilderness Designation	8	0

Manageability of the Area as Wilderness

Each of the areas would be manageable as wilderness. The location and difficulty of access to each of the WSAs ensures solitude for the visitor. While the carrying capacity of each of the rocks and islands is limited, the number of visitors will undoubtedly always be small. There are no surface or mineral-estate inholdings, valid existing rights, valid mining claims, mineral leases, or rights-of-way associated with either of the WSAs.

Rationale for Selection of the Preferred Alternative

Both North Sisters Rocks and Zwagg Island are relatively free of the signs of human activities and appear to have been affected primarily by the forces of nature. There is considerable opportunity for solitude on these rocks and islands, which are surrounded on three sides by ocean and border an undeveloped beach. They afford a good view of the surrounding coastline and are good vantage points from which to view migrating birds and marine mammals. A sensitive plant species and important archaeological values would be protected by wilderness designation.

Management of the WSAs as wilderness would be consistent with the U.S. Fish and Wildlife Service's management of other offshore rocks and islands as a wildlife refuge and wilderness.

Affected Environment

This section discusses only those activities or resources that influence the character of the study area, or that may be affected by the alternatives.

Wilderness Values

Naturalness

Both WSAs are in essentially natural condition and appear to be primarily affected by the forces of nature. Well-worn but unobtrusive foot paths wend their way from the bases to the top of each rock and island. The beaches surrounding each rock and island are isolated and undeveloped, but quarry scars, powerlines, highways, and housing developments are visible on the mainland.

Table 2. Summary of Environmental Consequences of Alternatives, North Sisters Rocks (OR-12-8) and Zwagg Island (OR-12-14) WSAs

Resource or Activity	All Wilderness (Preferred Alternative)	No Wilderness/No Action
Wilderness Values	The 8 acres on the North Sisters Rocks and Zwagg Island would be added to the National Wilderness Preservation System. Wilderness values would be preserved.	Wilderness values could be impaired if rock were quarried. Quarrying is possible, but not likely.
Energy and Mineral Development	Rock quarrying would be precluded. Potential for development limited by lack of demand and poor quality rock.	Areas would remain open to development.

Opportunities for Solitude or Primitive and Unconfined Types of Recreation

Opportunities for solitude are outstanding in the North Sisters Rocks and Zwagg Island WSAs. This is particularly true during the frequent occasions of rain, strong winds and fog. During the less frequent clear days and especially during the summer tourist season, the opportunities for solitude are diminished due to the small size of the rocks and islands and the easy hike from nearby points of public access.

Recreational opportunities are abundant within the WSAs. The islands afford spectacular views of the ocean and rugged coastline as well as the annual migrations of many species of marine mammals and birds. Excellent rockfishing is available on the seaward side of each island and a rockshelf on the north side of Zwagg Island is a good gathering site for abalone.

Special Features

A plant species of special interest, *Dudleya farinosa*, occurs on the windswept, often harsh environment at the top of each rock and the island. (This plant is discussed further in the Vegetation section.) Several thousand gray whales pass within a few hundred feet of the islands during annual migrations. The islands' scenic vistas are outstanding.

Diversity in the National Wilderness Preservation System (NWPS)

According to the Bailey-Küchler system of classifying ecosystems, the WSAs are in the Pacific Forest Province and have a potential natural vegetation of spruce-cedar-hemlock forest. The island and rocks do not contain any terrestrial ecosystems listed in the Oregon Natural Heritage Plan, but they are bordered by several of the marine aquatic ecosystems listed in the plan.

Within 5 hours' driving time of the WSAs, there are four standard metropolitan statistical areas with populations over 100,000: Eugene/Springfield, Portland, Salem, and Medford, Oregon.

Energy and Mineral Development

There are no mineral potentials associated with any of the rocks and island in the WSAs. There may be some potential to use the rocks for jetty material, but better quality and more readily available rock is found nearby. As of January 1, 1984, there were no mining claims or leases in the WSAs.

Vegetation

The dominant vegetation of Zwagg Island is a mixed cover of poison oak/salal, while the North Sisters are capped by a dense mat of grass. A plant of special interest found in the WSAs (mentioned in the Special Features section) is *Dudleya farinosa* (sea cliff stone-crop). This plant species is on List 2 of the Oregon Natural Heritage

Plan's "Rare, Threatened and Endangered Plants and Animals of Oregon."

Wildlife

Marine mammal and bird use of the WSAs is minimal. Frequent visitations and disturbance by humans have probably precluded the development of rookeries on the rock and island tops. Ospreys have been observed perching on spruce snags at Zwagg Island.

Recreation Use

Recreational use of the WSAs is sporadic. Some rock fishing occurs throughout the year, but most use occurs during the summer. Reaching the tops of the rocks and islands is a challenging experience for most individuals, but the spectacular view attracts some interest.

Economic Value and Local Income

There are no significant economic values or activities directly associated with the rocks and island. The amount of recreational activity is small.

Environmental Consequences

This section discusses the environmental consequences of implementing each of the alternatives. Resources and activities not significantly affected by any of the alternatives are not discussed. General impact conclusions applicable to all WSAs, including impact conclusions based on speculative future developments (developments which are possible, but are not currently proposed), are discussed in the Statewide EIS volume. That volume also discusses certain assumptions that were made for this analysis.

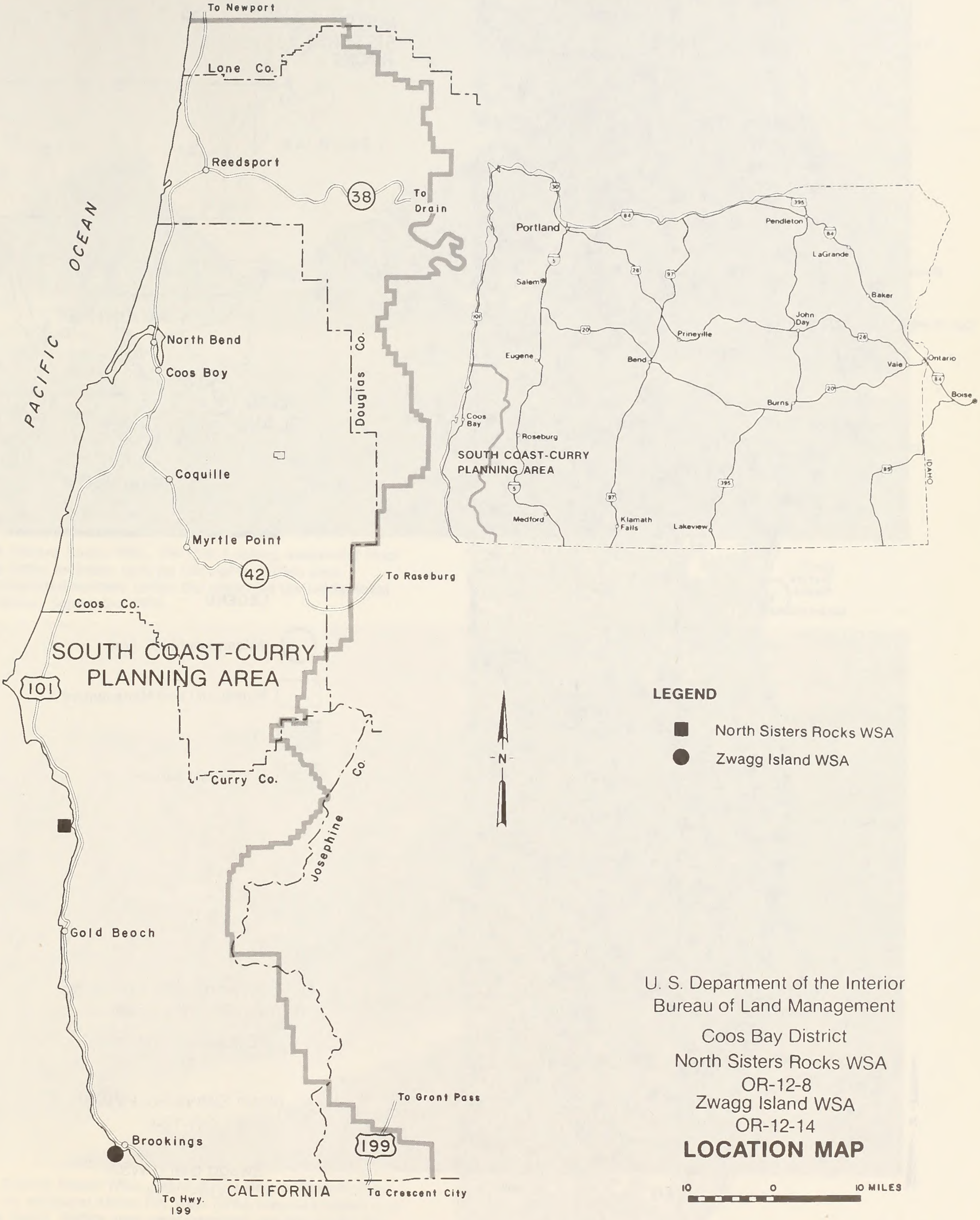
Effects on Wilderness Values

The **all wilderness alternative** would add two coastal rocks (totaling 3 acres) and an island (of 5 acres) to the National Wilderness Preservation System. It would assure the preservation of the wilderness characteristics of naturalness, opportunities for solitude and primitive and unconfined types of recreation, and special features associated with the rocks and island.

Under the **no wilderness/no action alternative**, the public lands in the two WSAs would not be managed as wilderness. It is possible, but not likely, that rock would be quarried on the rocks and island. If such development occurred, the area's wilderness values would be adversely affected.

Effects on Energy and Mineral Development

Areas designated wilderness would be withdrawn from mineral exploration and development. The **all wilderness alternative** would preclude use of any of the rocks and island for jetty rock, but lack of demand for riprap material and the poor quality of this rock makes the potential for development unlikely. The **no wilderness/no action alternative** would leave the areas open for potential exploration or development.



LEGEND

■ North Sisters Rocks WSA

● Zwagg Island WSA

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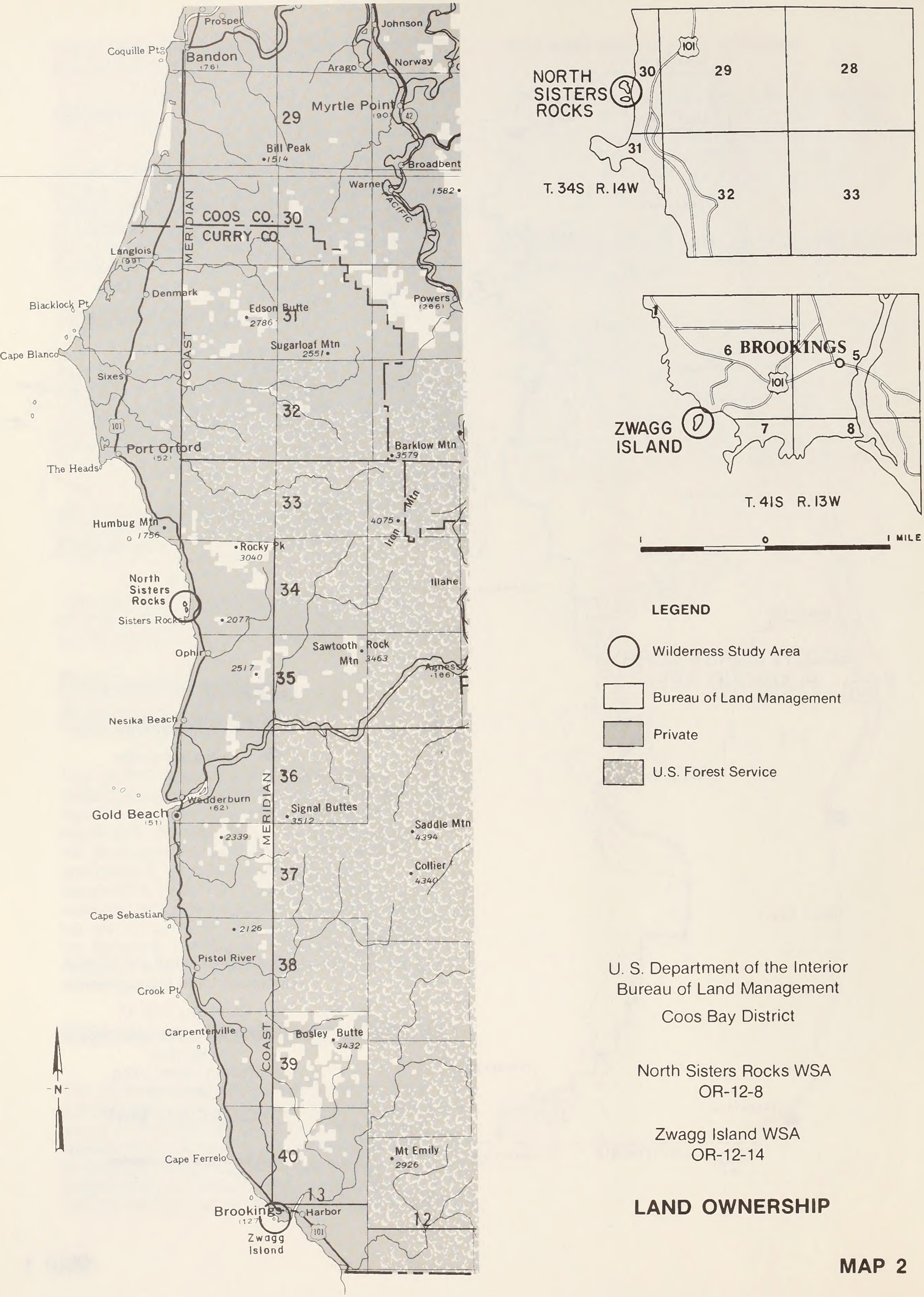
Coos Bay District

North Sisters Rocks WSA
OR-12-8
Zwagg Island WSA
OR-12-14

LOCATION MAP

MAP 1



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Coos Bay District

North Sisters Rocks WSA
OR-12-8

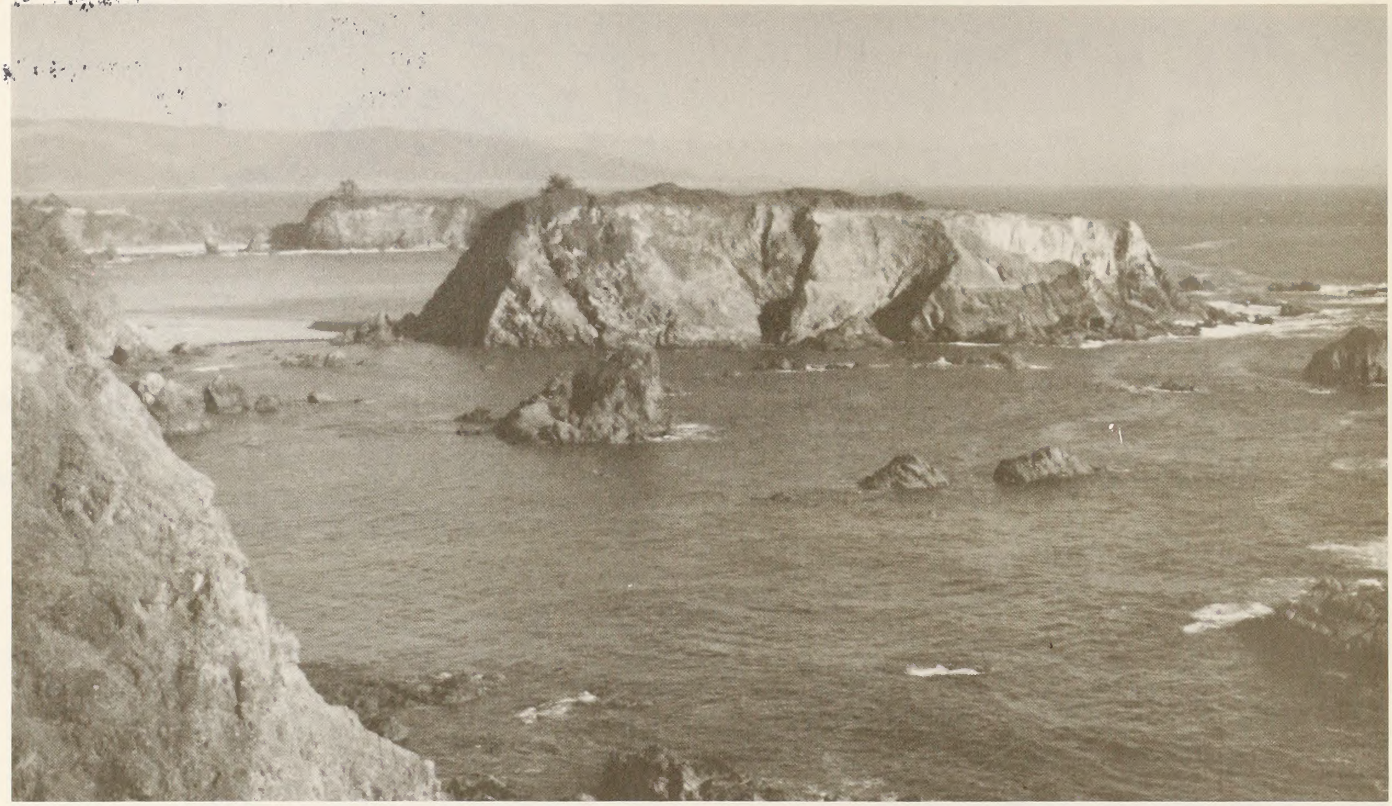
Zwagg Island WSA
OR-12-14

LAND OWNERSHIP

MAP 2

North Sisters Rocks WSA, OR-12-8. Looking southwest from shore (WSA includes rock on the right). Within area recommended suitable under the preferred (all wilderness) alternative. September 1979.

North Sisters Rocks WSA, OR-12-8. Looking northwest from slope on mainland above the WSA (WSA includes tallest rock on the right). Within area recommended suitable under the preferred (all wilderness) alternative. Date unknown.



Zwagg Island WSA, OR-12-14. Looking south from shore toward WSA (WSA is island in center of photo). Within area recommended suitable under the preferred (all wilderness) alternative. August 1978.

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MAP SYMBOLS

Road

Ways

Buildings

Fence

Corral

Pipeline

Powerline

Mine or Quarry

Reservoir or Retention Dam

Earth Tank or Charco

Perennial Stream

Intermittent Stream

Intermittent Lake or Pond

Dry Lake or Pond

Marsh

Lava

Sand

Spring

Improved Spring

Well

Artesian Well

Peak

Rims

Form 1279–3
(June 1984)
BORROW
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Oregon wilderness
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